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MECCANO MAGAZINE

THE MODEL WORLD AT YOUR FINGERTIPS

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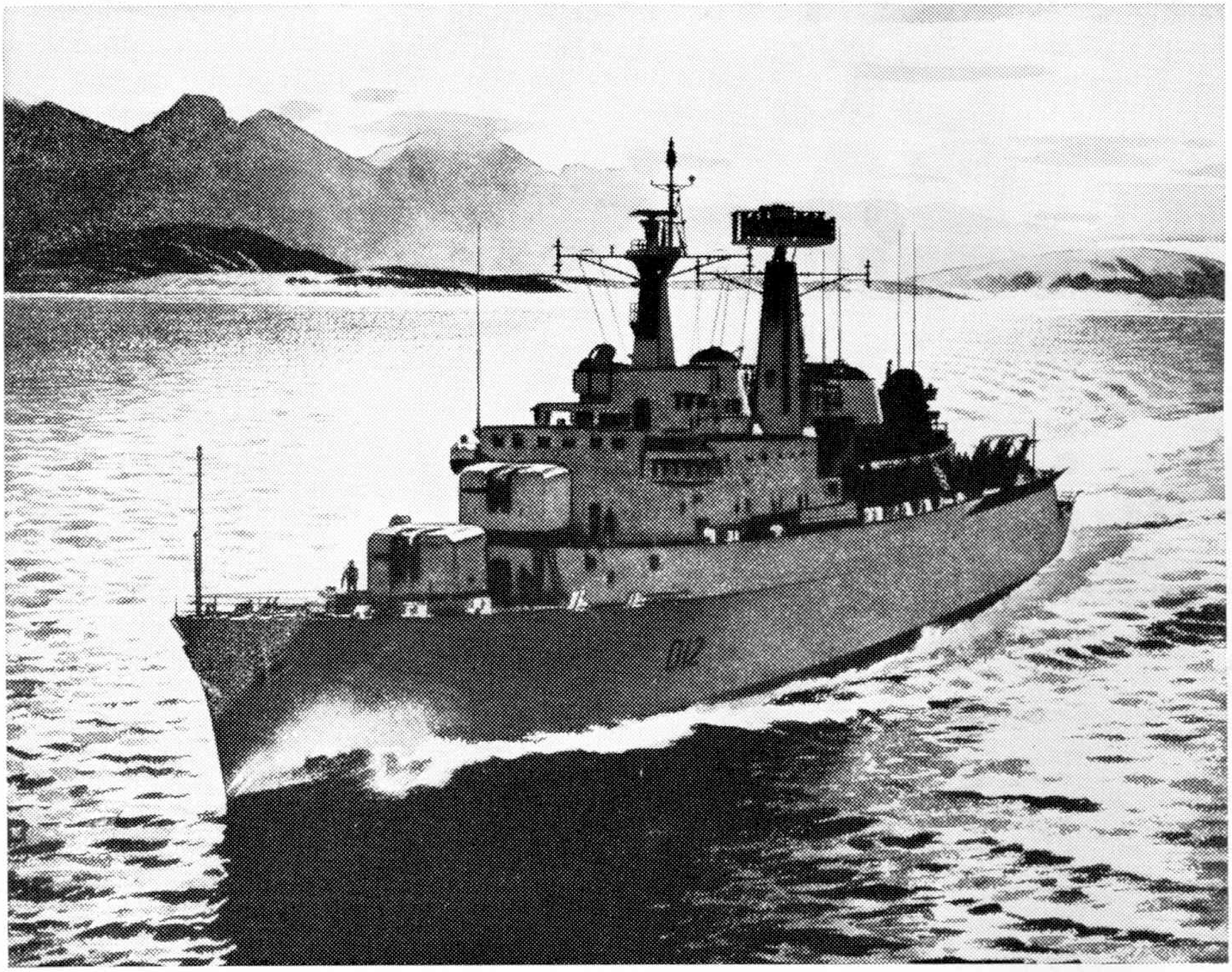

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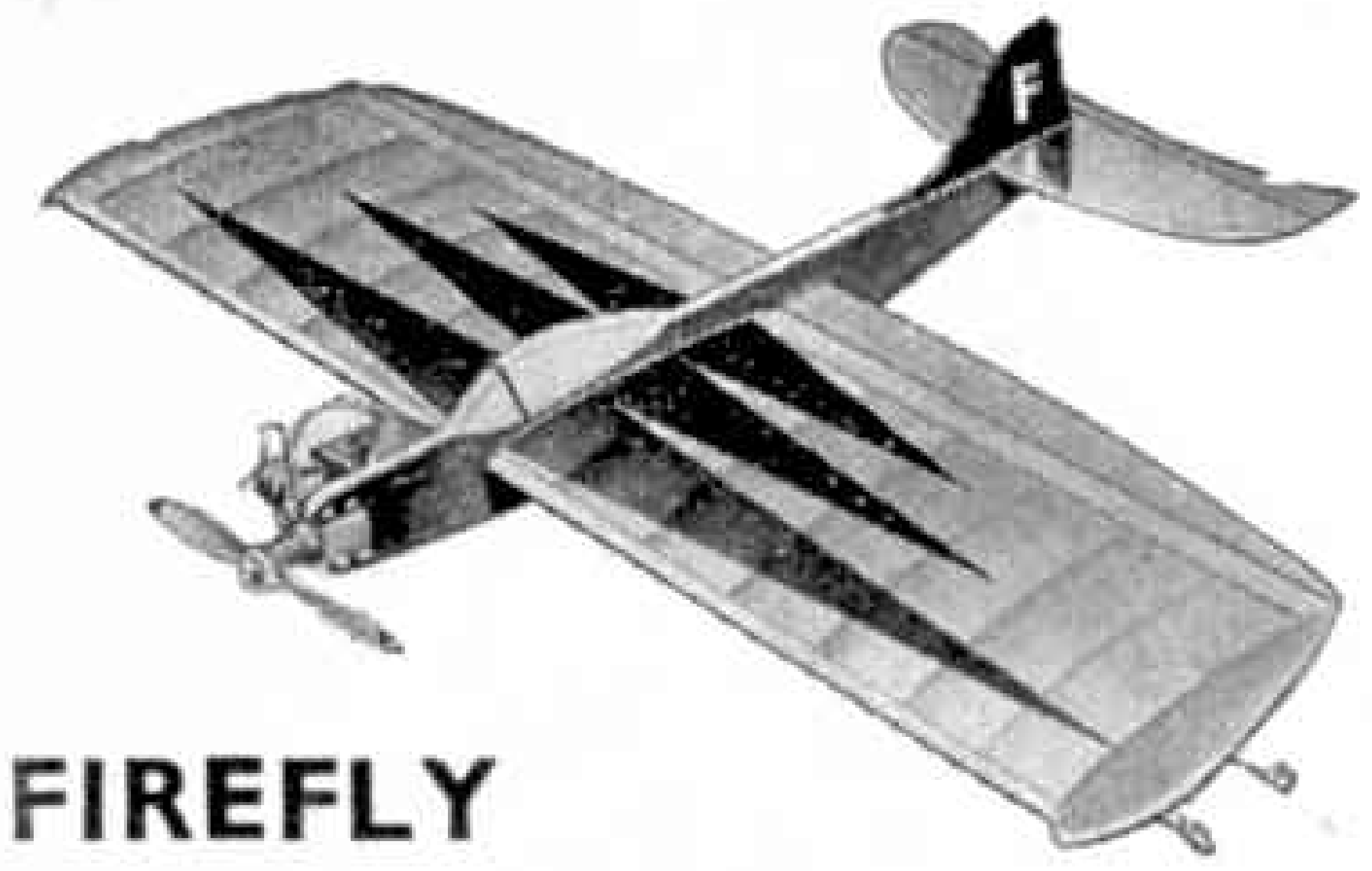

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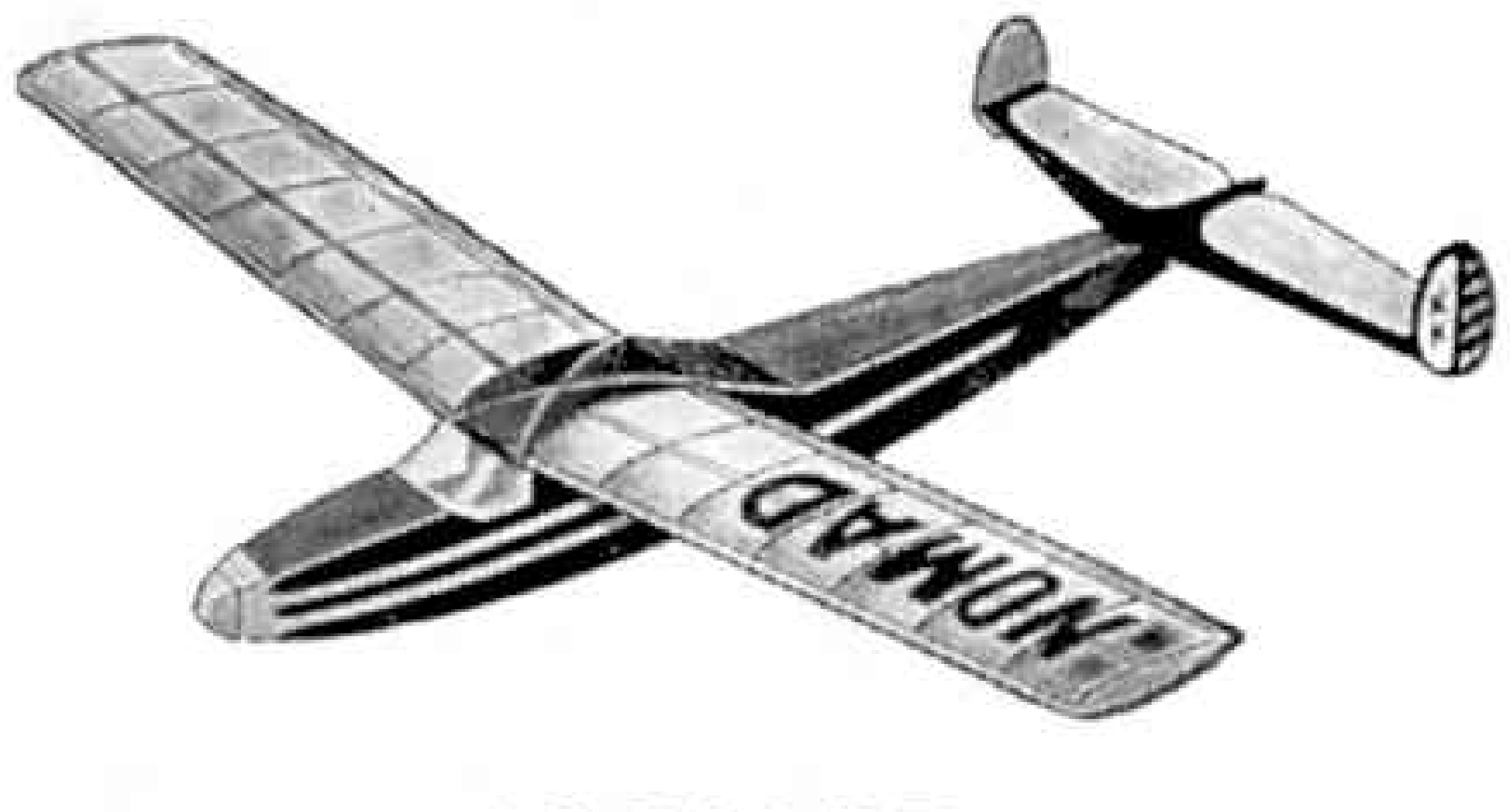

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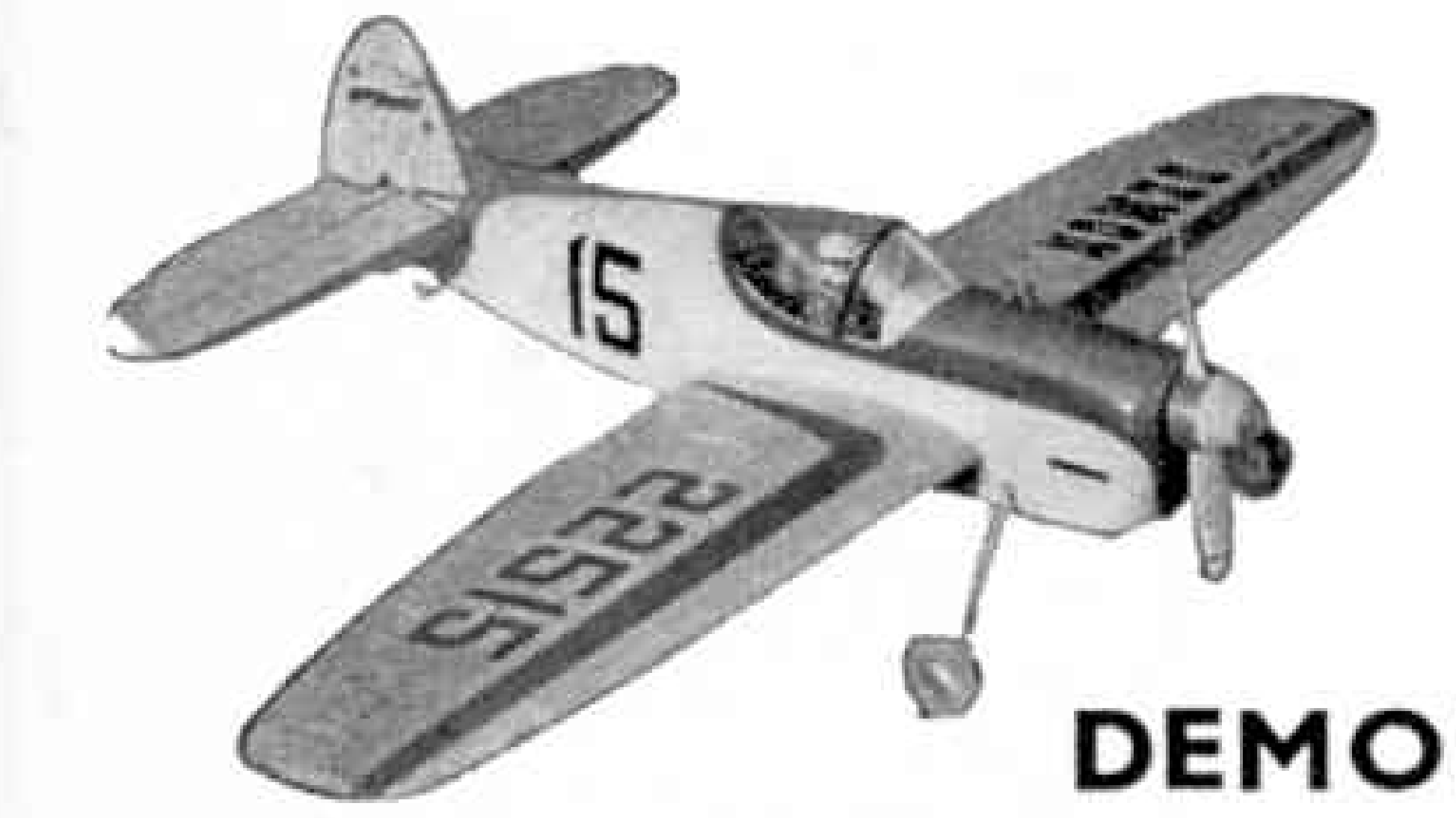

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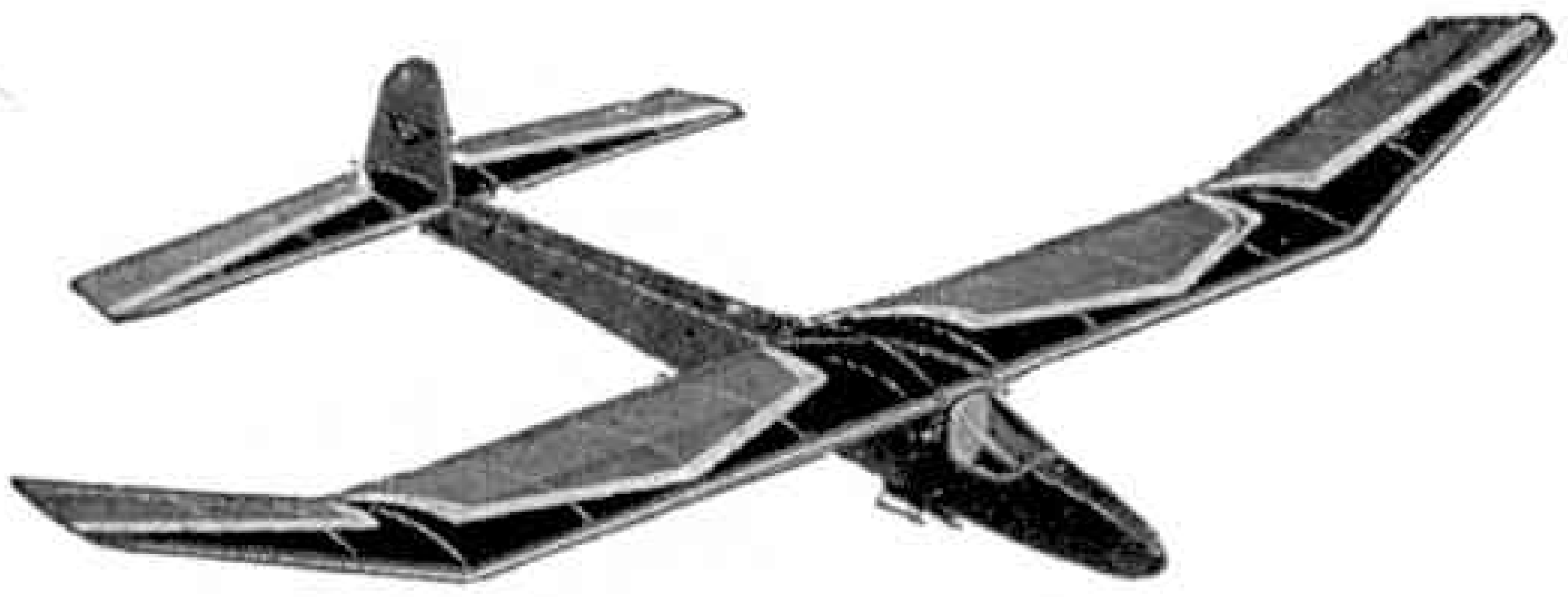

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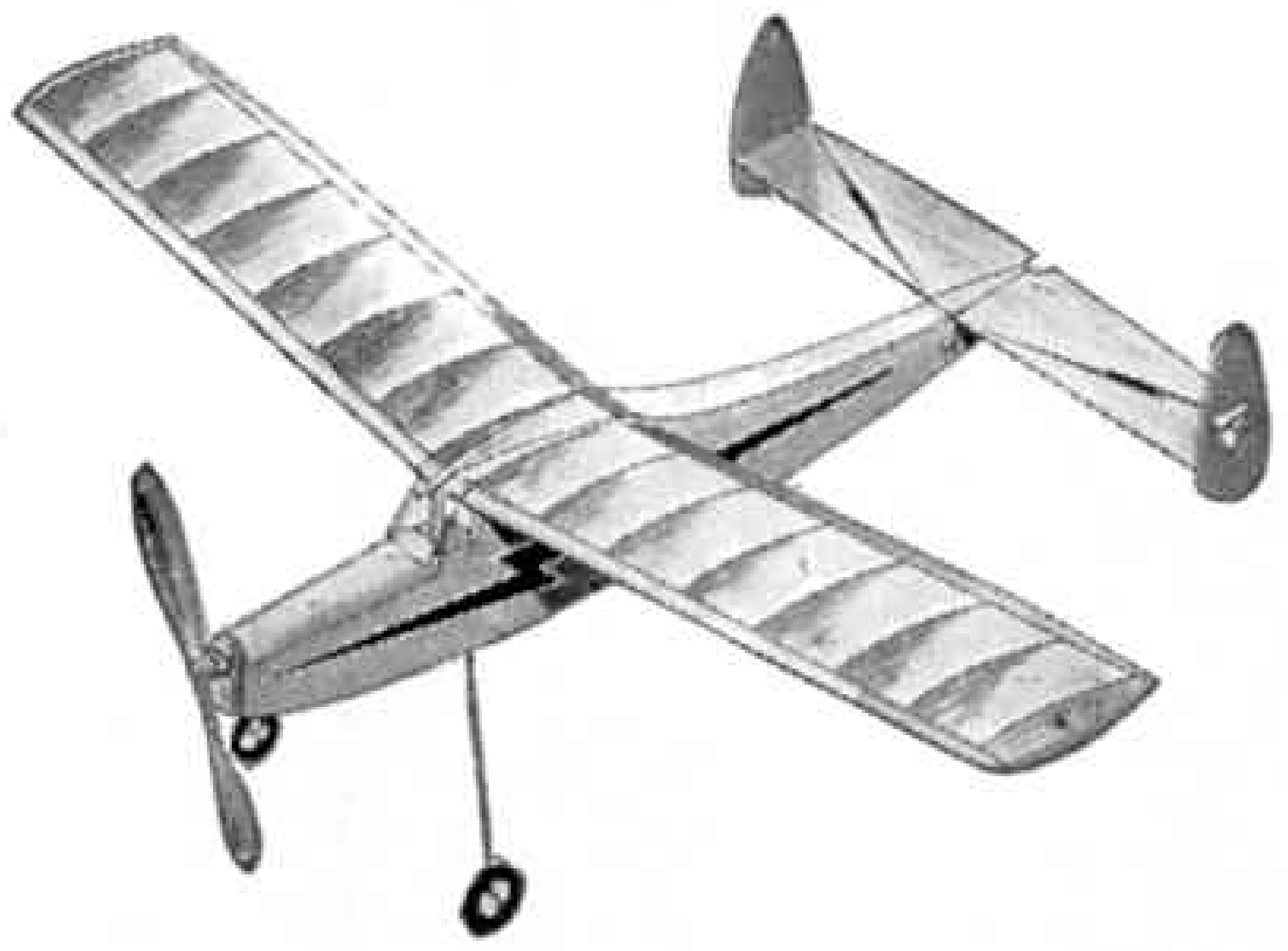

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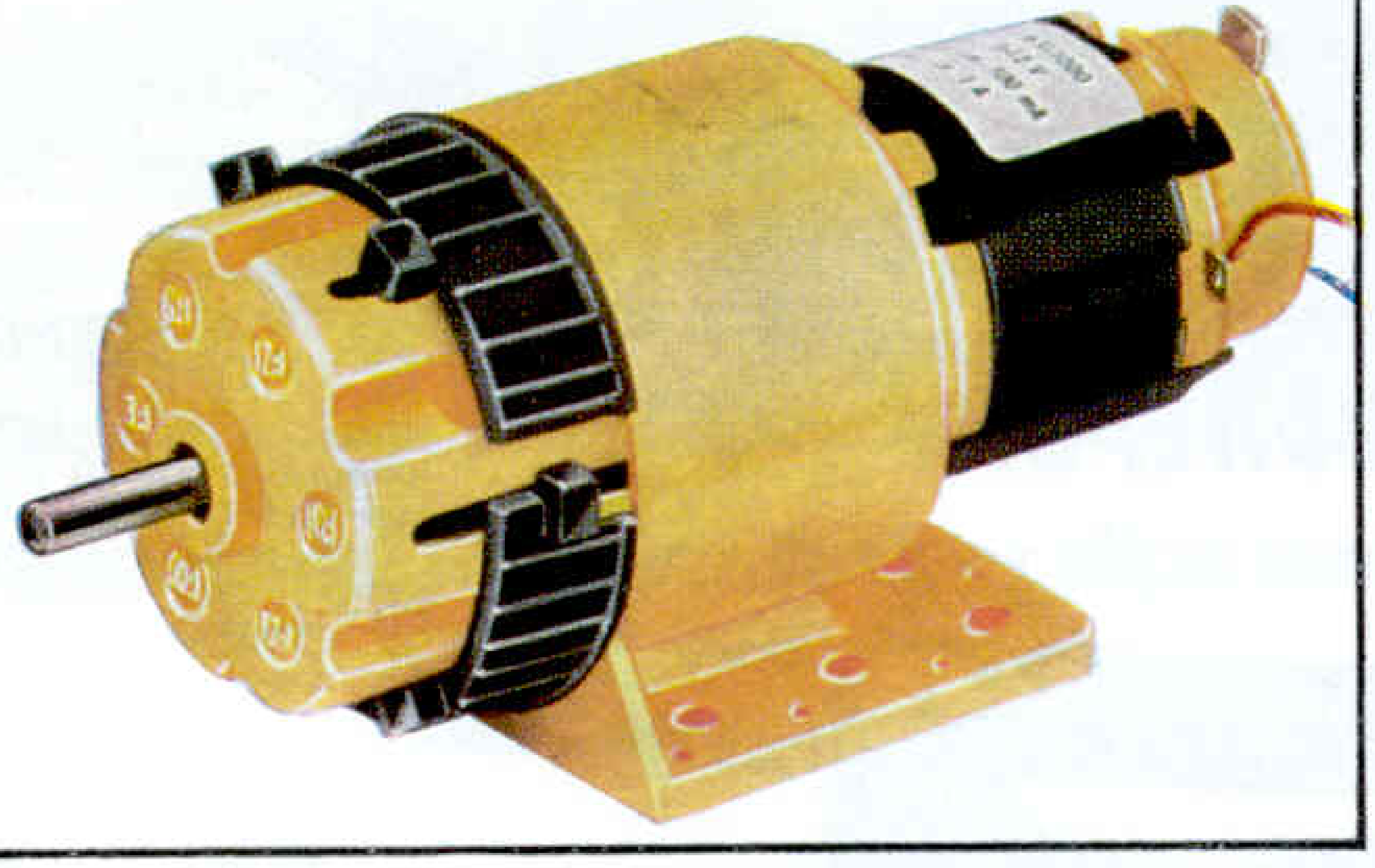

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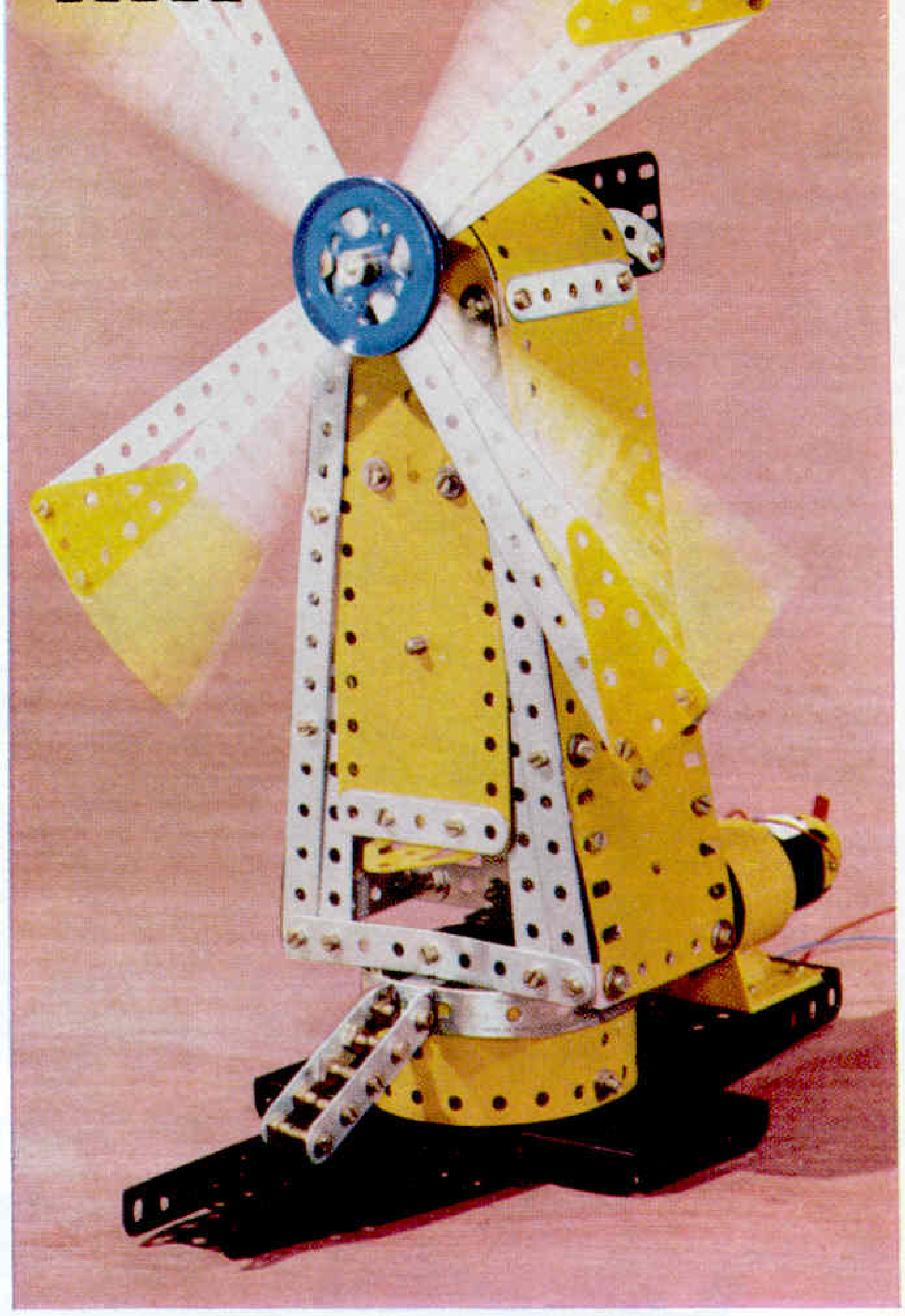

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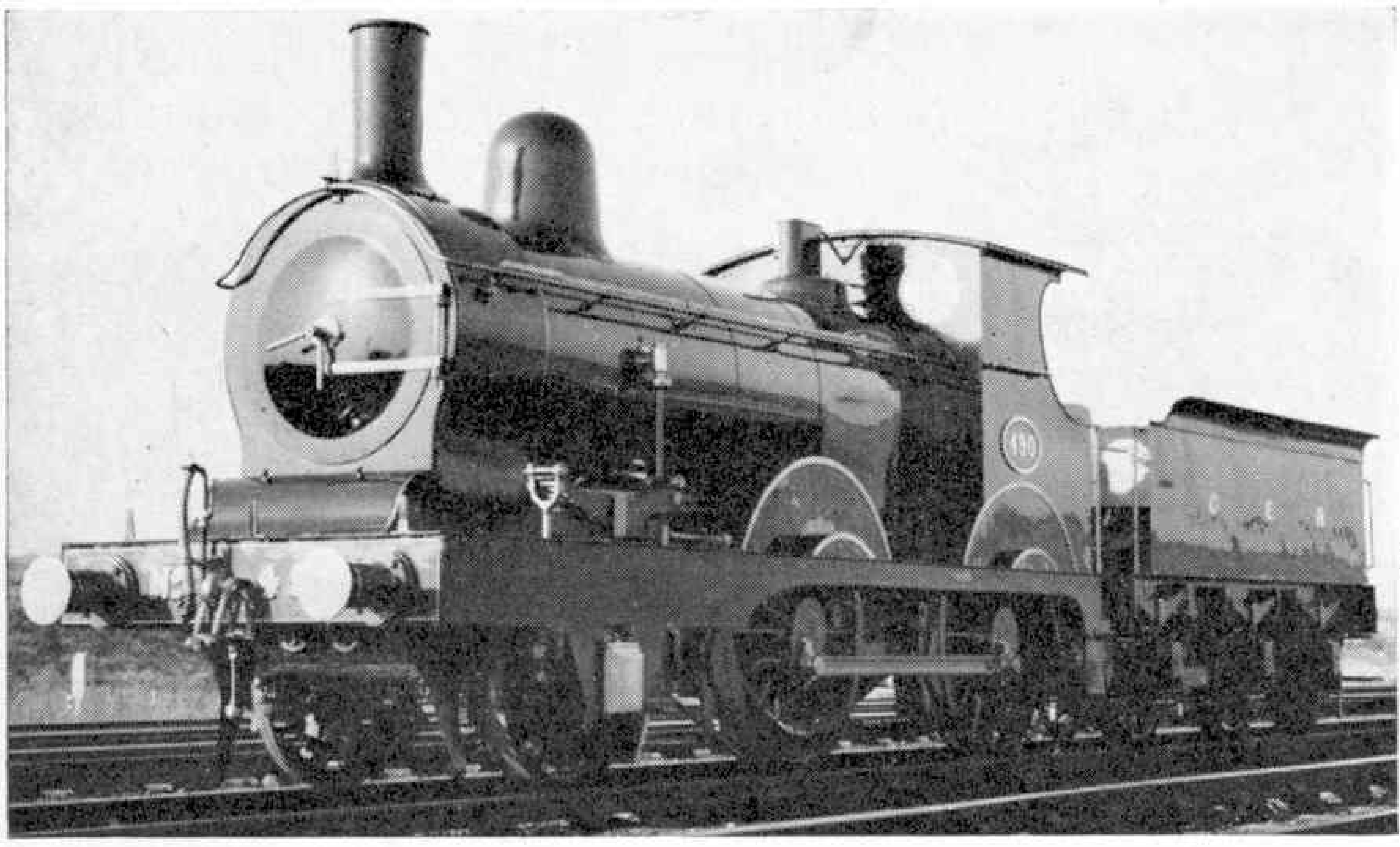

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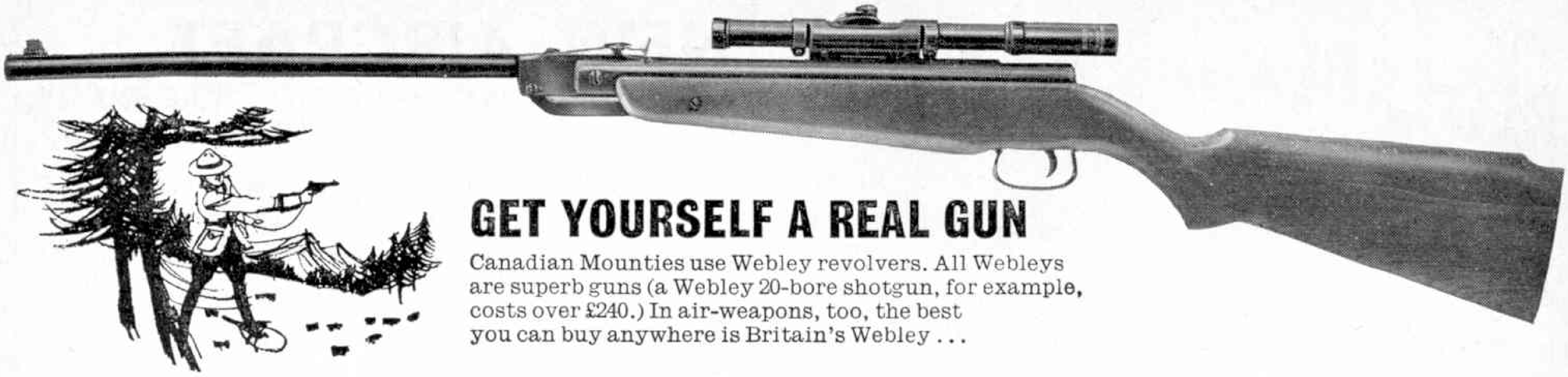

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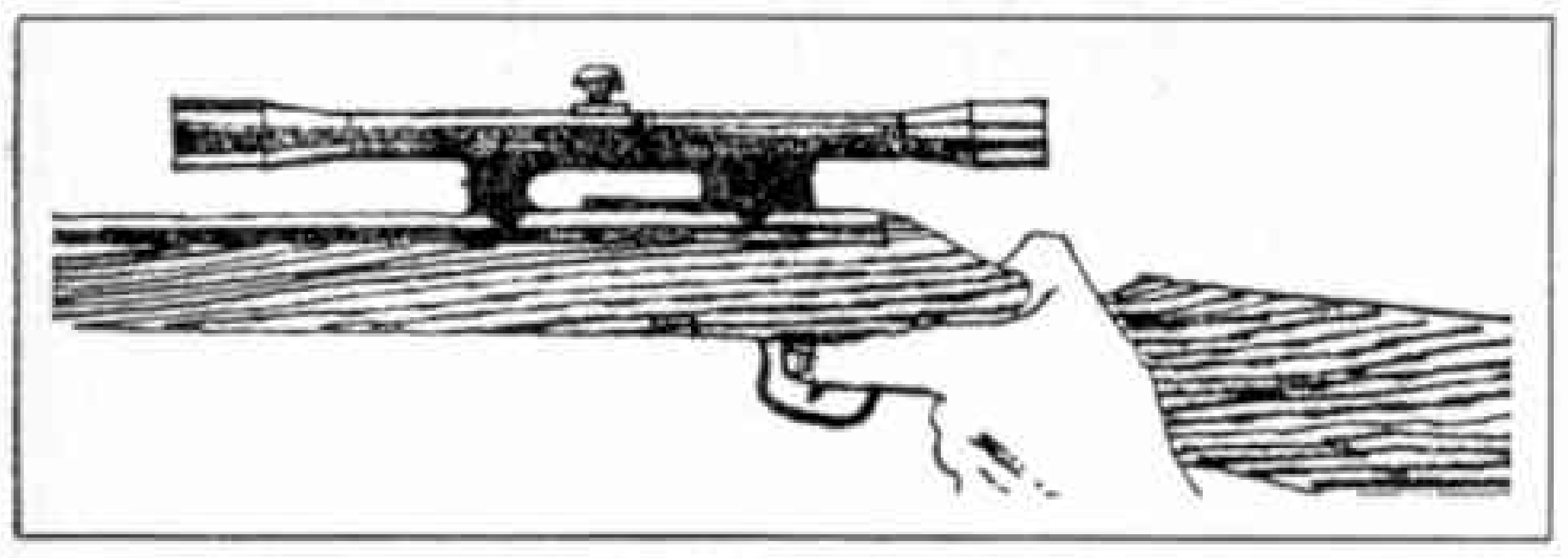

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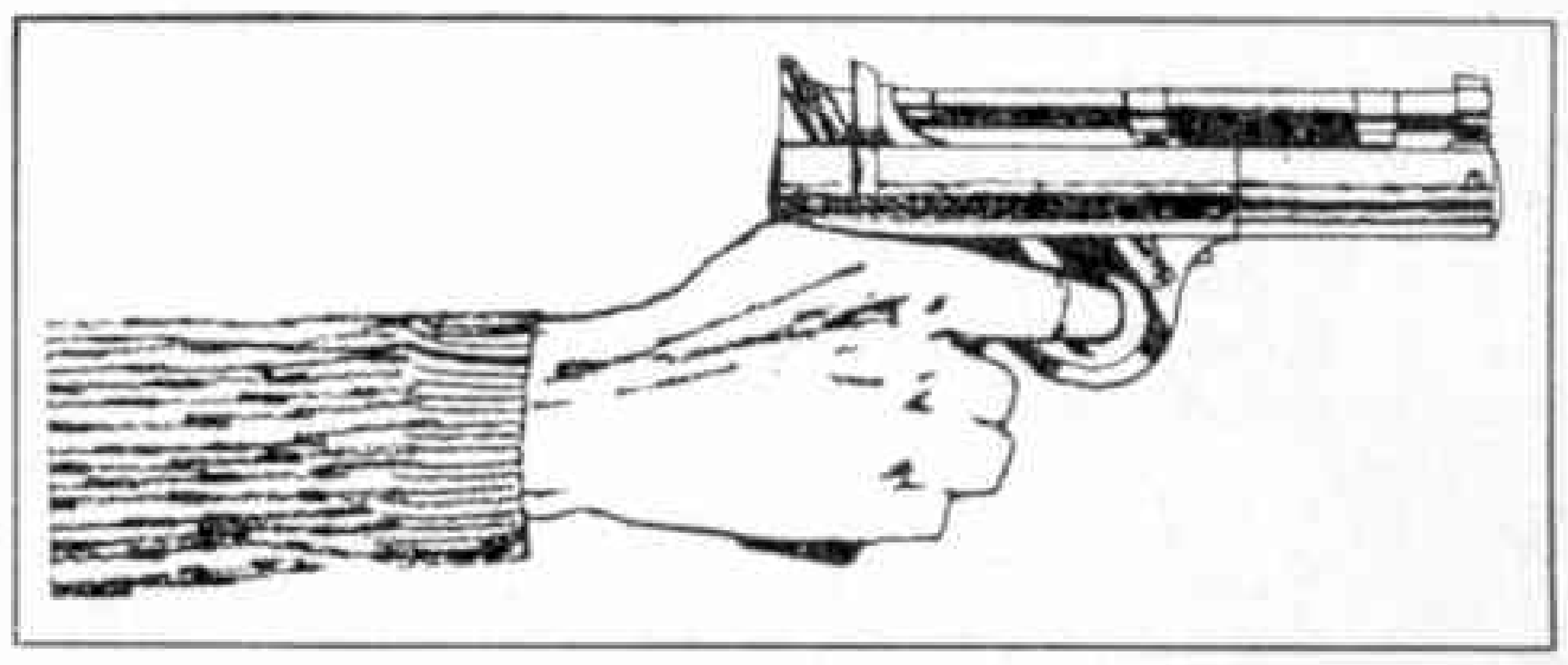

Shoot with safety Never point a gun, unloaded or not, at anyone. Never handle a gun before checking that it's unloaded. Always carry it so the muzzle is fully under your control. Never leave it where people younger or less responsible than you can meddle with it. Never leave a loaded gun unattended. Always make sure no-one is behind your target before opening fire.

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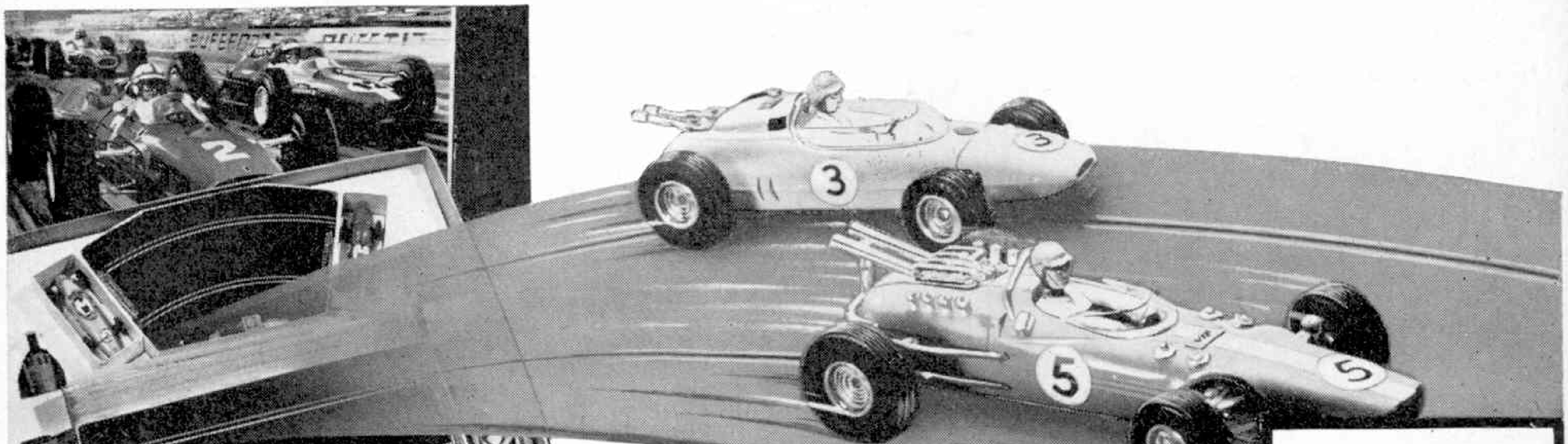

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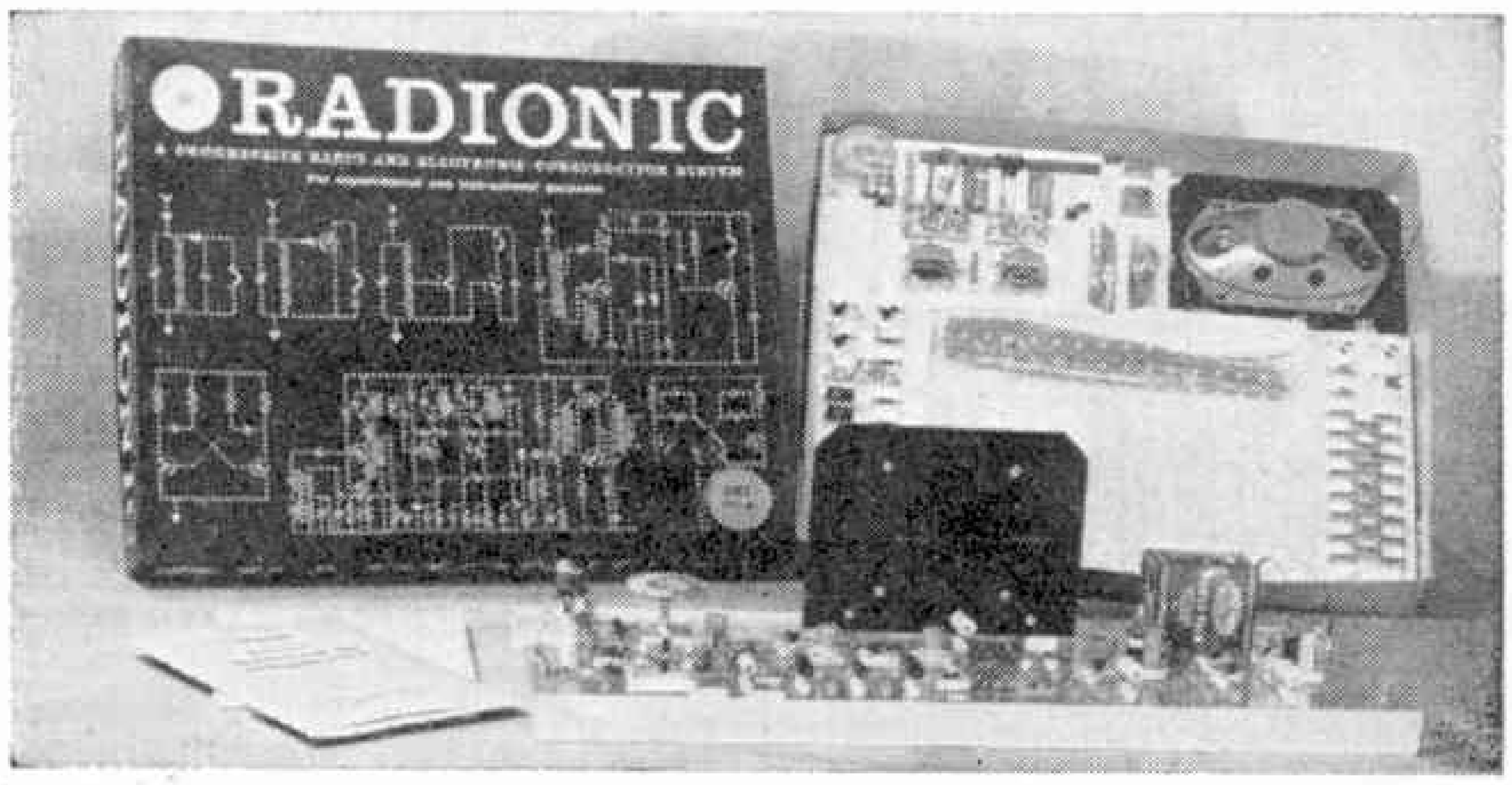

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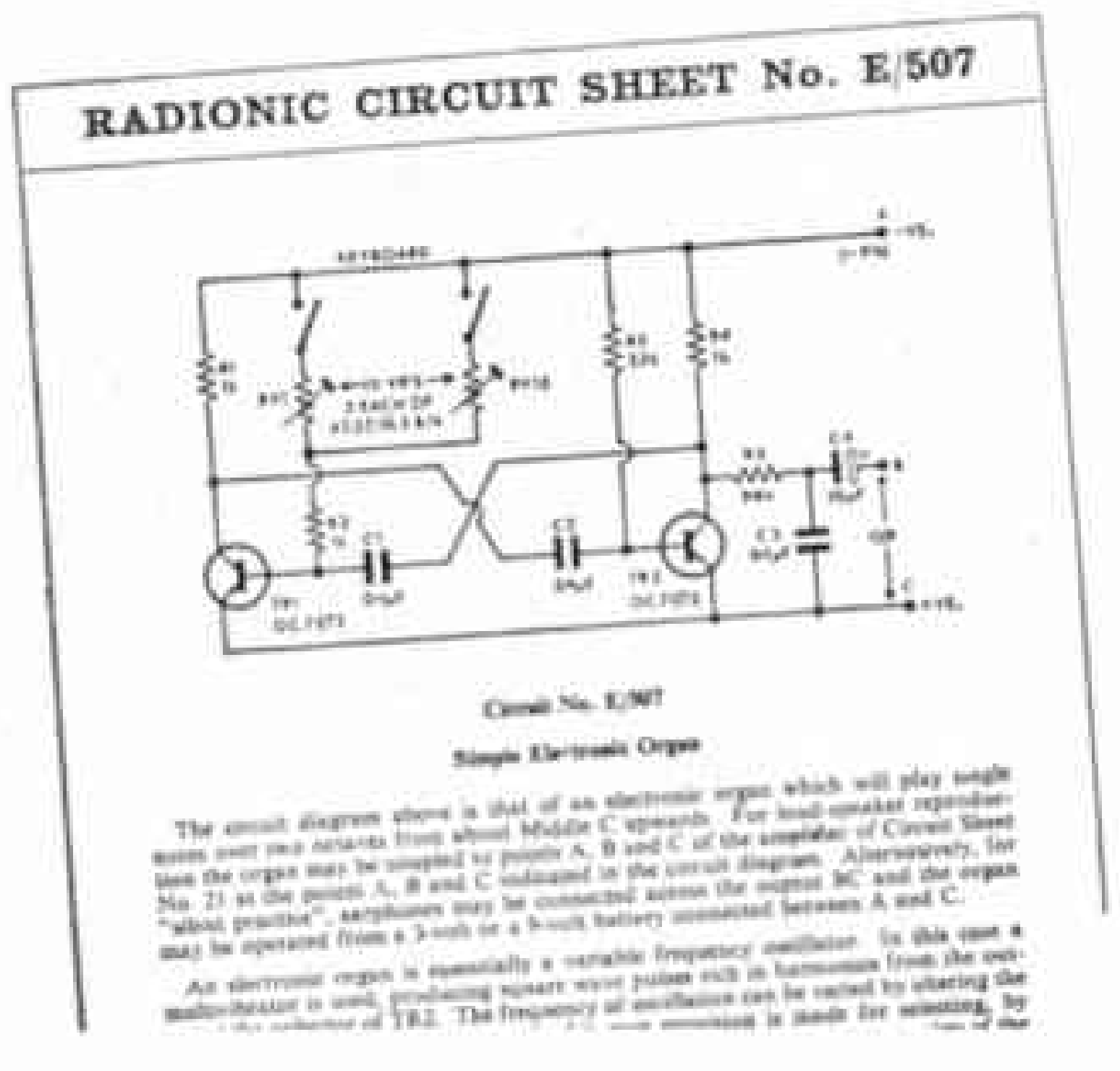

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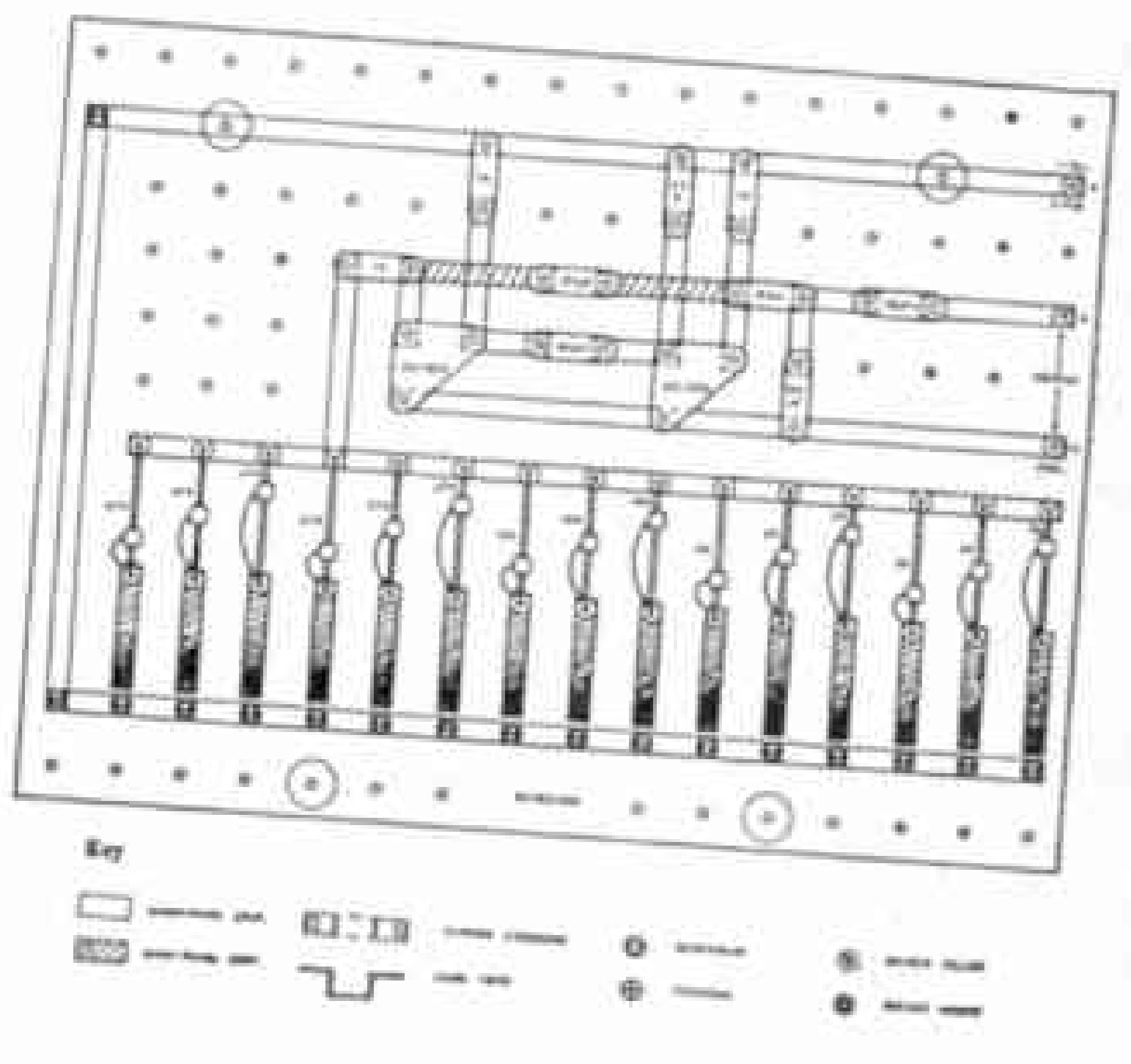

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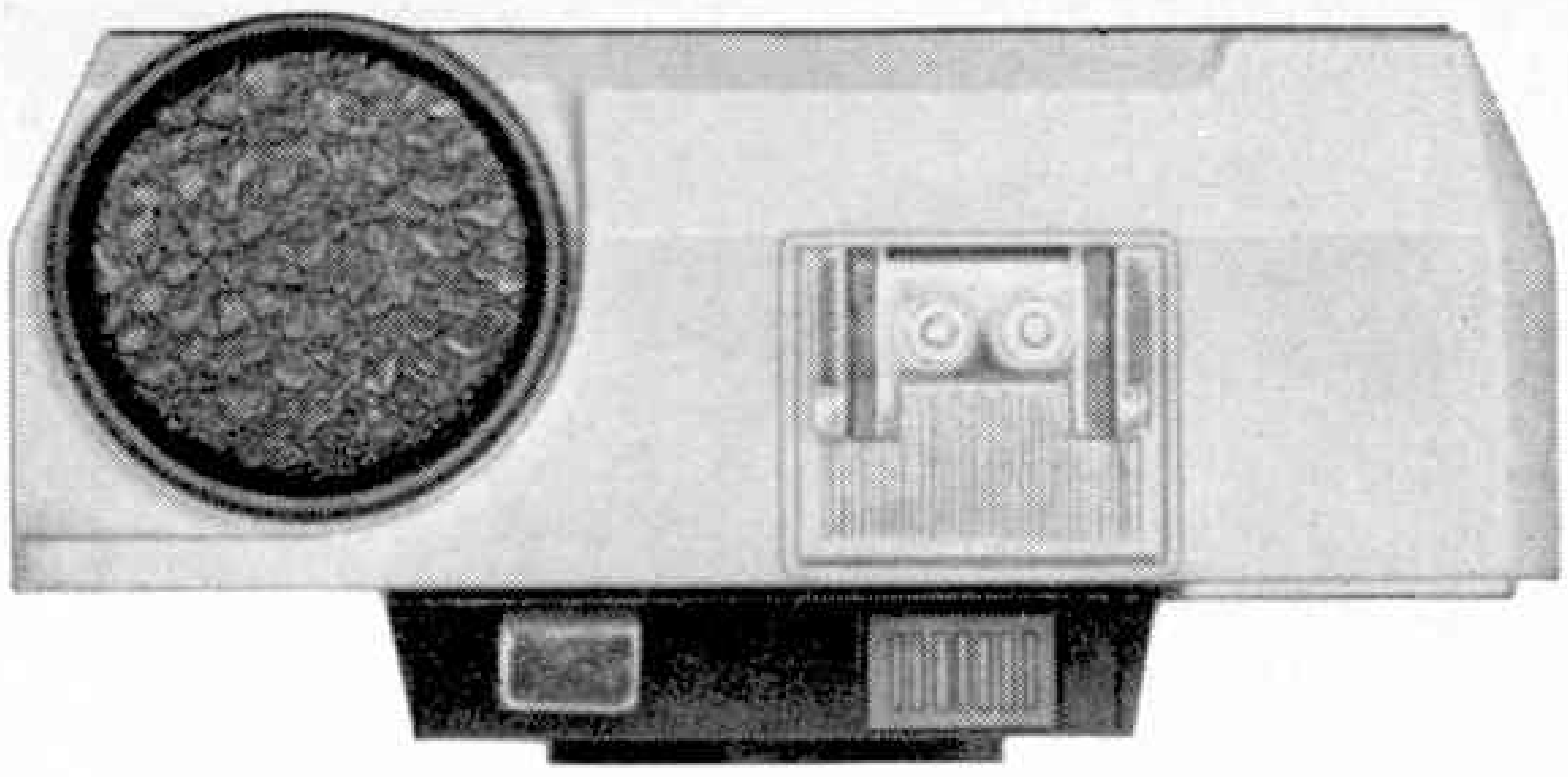
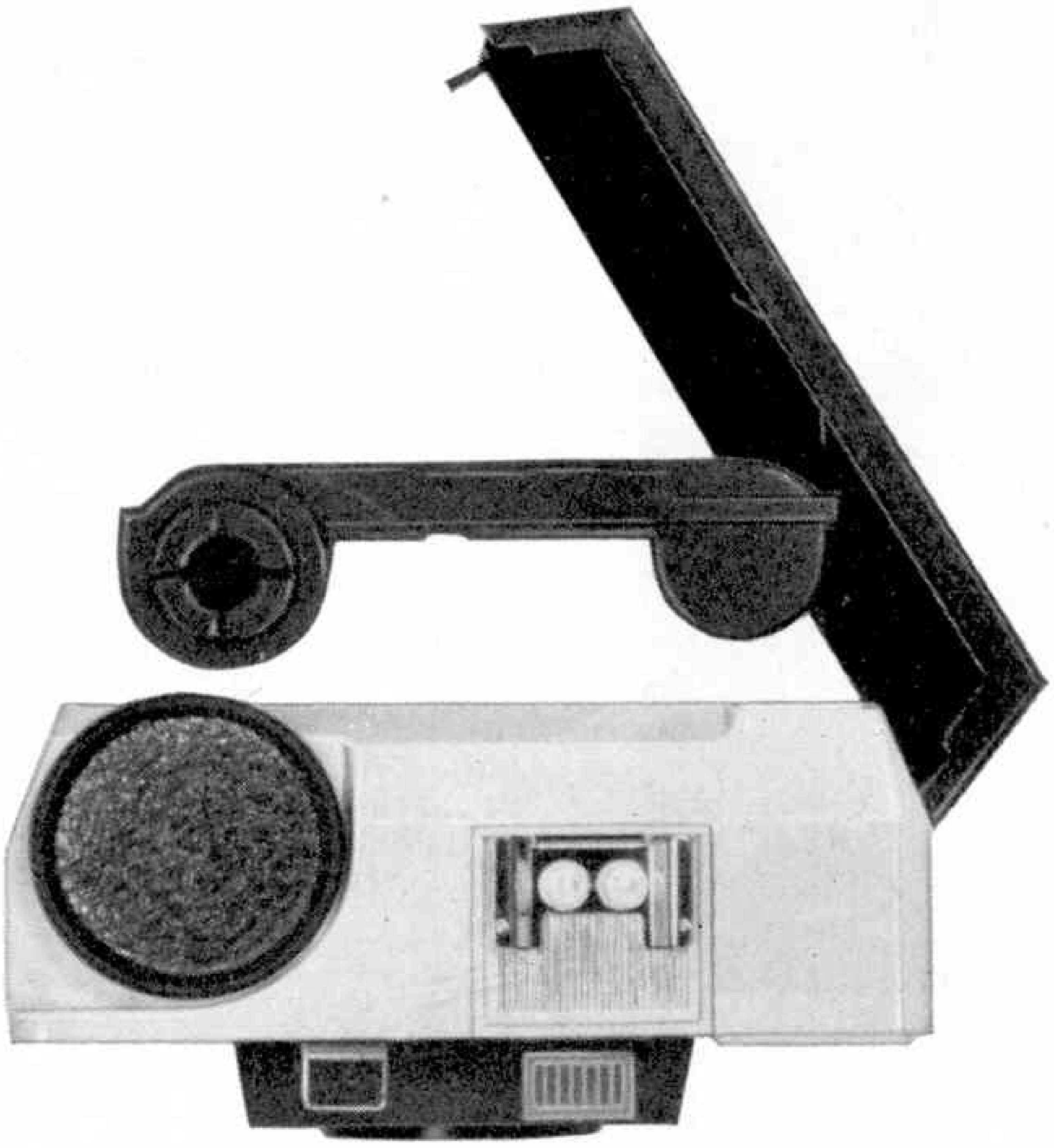
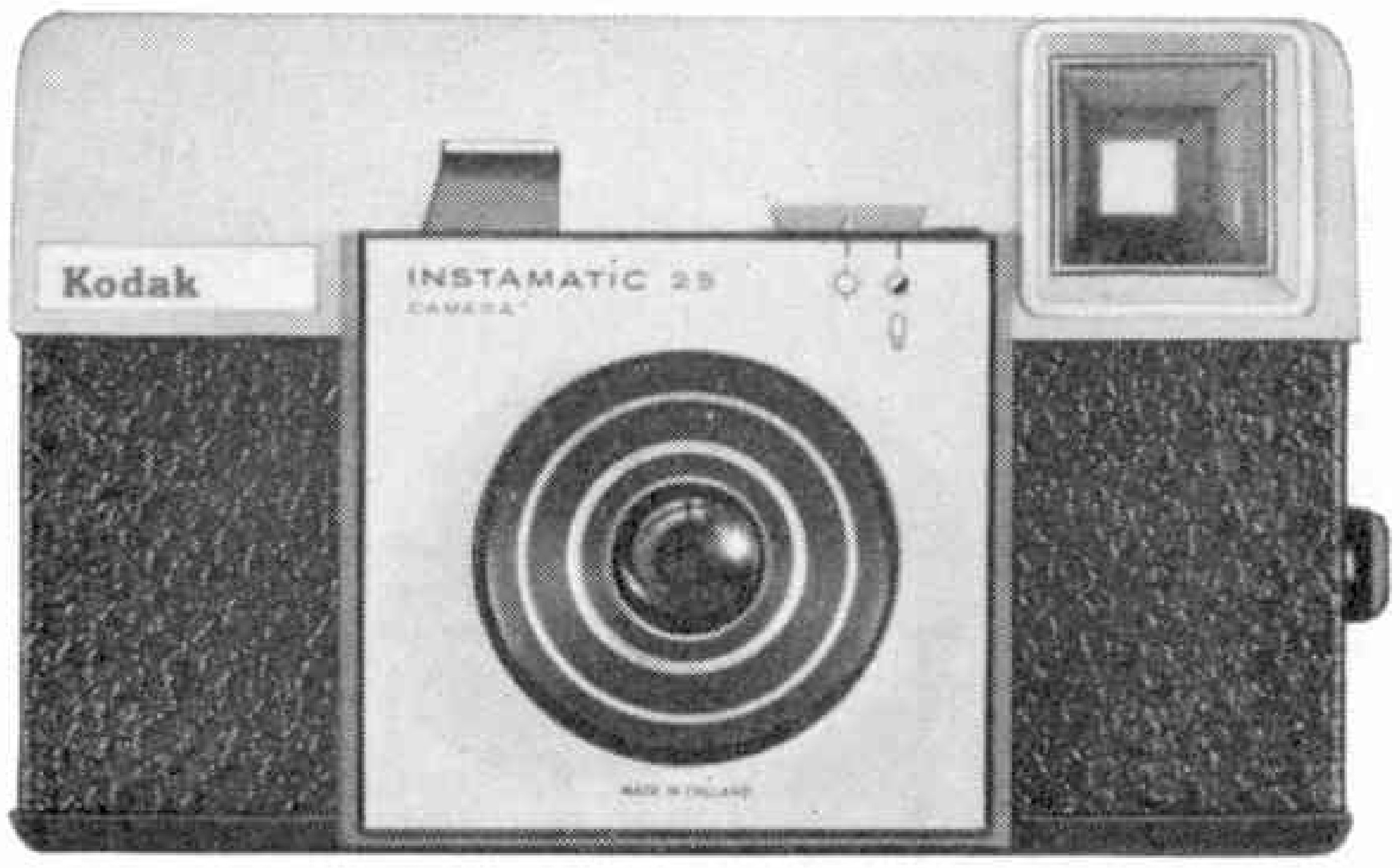


On your marks



get set



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THE MODEL WORLD AT YOUR FINGERTIPS

MECCANO MAGAZINE

THE MODEL WORLD AT YOUR FINGERTIPS

JUNE 1967 VOLUME 52 No. 6

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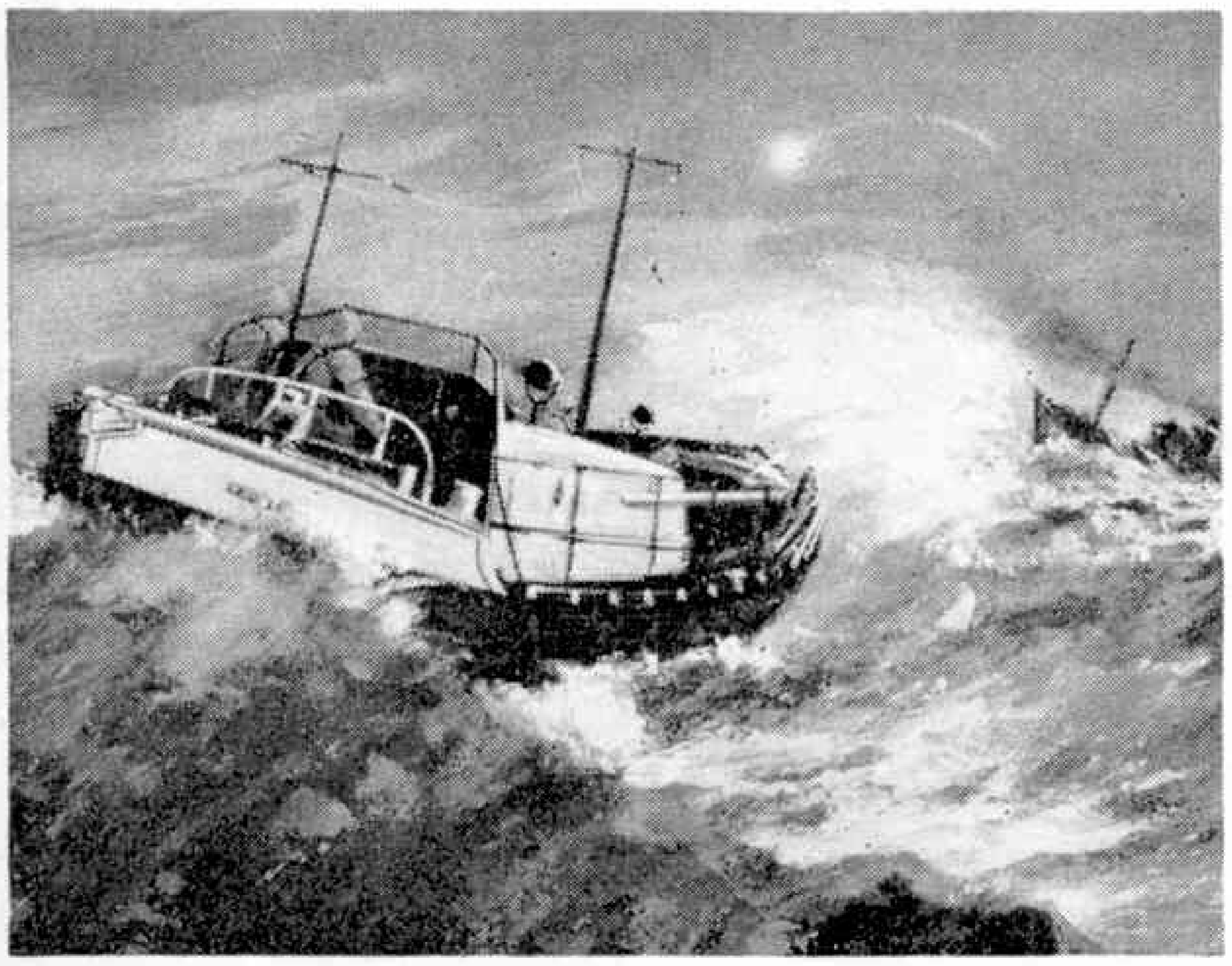
The Caister Lifeboat in action in a heavy sea. Read about the new Frog model on page 22 of this issue



Contents

Airborne in the Alps 8
MM Submarine 10
Helicopter 11
Tank Museum 12
Cycling is a Science 16
End of the Road 19
Oil Strike 20
Frog Lifeboat 22
Dolphin 16 Runabout 23
Vernier Rule 25
Home of the Flying Scouts 26
At the Turn of a Wheel 28
Computer 30
Have You Seen? 33
Bangthorn 36
No Knife Needed 39
Dinky Toys 40
Meccano Sawmill 42
Meccano Mechanical Grab 44
Slot-Racing 47
Among the Model Builders 48
Stamps 51

This is an unhappy editorial, and one which no journalist ever likes to write, any more than readers like to receive.

Today's economic circumstances have made similar pronouncements only too frequent in recent years, but the sad fact is that the next issue of Meccano Magazine will be the last one.

Many of you have been taking the M.M. for a great number of years and the end of the magazine will be akin to the passing of an old friend who, for over half a century, has been an eagerly anticipated monthly visitor.

Your letters, during the course of my comparatively short two year association with the M.M., have been tremendously encouraging and, practically without exception, you have supported our efforts to revitalise the magazine and provide the kind of features you wanted to read.

The high proportion of our readership whose principal interest is in the Meccano model building section, will find the non-appearance of the magazine particularly depressing, since this section of M.M. was, of course, unique to the publication and it is paradoxical that the magazine closure takes place at a time when the Meccano system is more popular than ever.

For all of you, next month's final issue will be an important one, there will be a heavy demand for it, so make sure of your copy by placing a firm order with your newsagents.

Due to the fact that the July issue of MM will be the last, the 1967 Meccano Model Building Competition has had to be cancelled.

Overseas winners of the December Dinky Toy Competition

J. Hackett, Luton Road, Richmond, B.C., Canada. Symul. Pierre-Francois, Ruie Bonry, Rotheux (Liege), Belgium. F. Dlasalle, Rue Mage, Toulouse, France. B. Foster, Mockomsbacken, Farsta, Sweden. Versailles Jacques, Rue Au Beurre, Ypres, Belgium. Reid Thomas, Schwandenstrasse, Kilchberg, Zürich, Switzerland. Jean Claude Bourgeois, Saint Marcel, Les Valance, France. Jean Marc Guillaume, Boulevard des Castors, Lyons, France. Bill Dehnke, Schwandenstrasse, Kilchbery, Zürich, Switzerland. Lorenzo Raffo, Viale, Lexert 2, Aosta, Italy. Robert Theirsen, Rue Marechal Foch, Virton (Belgique). Charlie Buckerfield, W. Avon Circle, Rochester, Michigan, U.S.A. Mohamed Fouad Awad, Messaha Street, Bulkely, Alexandria, Egypt, U.A.R. John Greydanus, Rockford, Alberta, Canada. Francis McNamee, Paris Street, Sudbury, Ontario, Canada. Peter Moyle, Thompson Avenue, Peterboro, Ontario, Canada. William Duncan, Cliffside Drive, Scarborough, Ontario, Canada. P. Ramachandran, Madhya, Pradesh, India. Mahen Aziz el Massi, Smouha, Alexandria, Egpyt, U.A.R. Joel E. Paloy, Seattle, Washington 98118, U.S.A.

On page 57 you will find details of a special Meccano Magazine tent offer. Here's your chance to get yourself a top quality tent for a considerable saving in cost. A valise is included with each tent, and the packed size is so compact that you can almost carry it in a big coat pocket! Ideal for the cyclist, camper, or as garden play-tents for the summer days ahead—send your order right away!

AIRBORNE

Unlovely but not unloved, is an apt description of the Pilatus Turbo-Porter—Here is John W. R. Taylor's story of a unique aeroplane with more virtues than its angular outline might suggest.

TO say that the Pilatus Turbo-Porter is one of the less beautiful aeroplanes of 1967 is an understatement. Its plank-like wings look as if they are made by the mile and cut off by the yard. Its nose is so long that the propeller seems to be trying to get away from the rest of the aircraft. As for its angular tail unit, with odd cut-outs here and there—it simply defies description.

Yet, although the Turbo-Porter may be unlovely, it is certainly not unloved. On the contrary, it is able to do such incredible things that the great Fairchild Hiller Corporation is building it under licence in America, as the Heli-Porter. No aeroplane designed by the Swiss aviation industry has ever before earned such recognition in the country that supplies most of the world's transport aircraft.

The key to the Turbo-Porter's success is indicated by its American name. The 'Heli' refers to the fact that its take-off and landing performance almost rivals that of a helicopter: the 'Porter' reminds us that it carries a heavy load, and does so at far less cost than a helicopter of comparable capacity.

I first met the Turbo-Porter at close quarters during the 1962 Venice Air Show, when I was invited to fly in it from the tiny grass airfield of San Nicolo, on the Lido island. Although there were five other people on board—a Swiss test pilot, German co-pilot and three Indians who just happened to arrive at the opportune moment—the aircraft leapt into the air so rapidly that I dropped my cine camera and did not find it again until we landed. This was disastrous, as my story of what happened would be far more credible if I had photographic evidence to prove it!

The particular Turbo-Porter in which I flew (HB-FAD) had a French Turboméca Astazou turboprop engine of 523 h.p. It is an interesting engine, as it runs at a constant speed. The pilot simply selects the r.p.m. he wants and, after that, engine power is varied entirely by moving the lever which changes the pitch of the propeller blades. There is, however, a red button in the centre of the instrument panel which the pilot can push to get sudden increase of power quickly in an emergency, such as the need to overshoot when making a difficult landing.

That red button played quite a big rôle in our demonstration flight.

At a height of about 1,500 ft. over the lagoon, the pilot lowered the huge flaps and adjusted the propeller pitch, until the aircraft was almost stationary against the head-wind. 'See how good it is for military observation,' he said. 'Now we stall.' We did. But there was nothing violent. The nose dipped and we began a gentle dive. 'Now see', said the pilot, pushing the red button. At once there was a surge of power from the engine and the Turbo-Porter pulled out of its dive into a steep climb. There could have been no finer demonstration of its ability to get out of a difficult situation, especially as the pilot had taken his hands and feet off the controls immediately after putting down the flaps, leaving HB-FAD to fly itself through the rest of the manoeuvres.

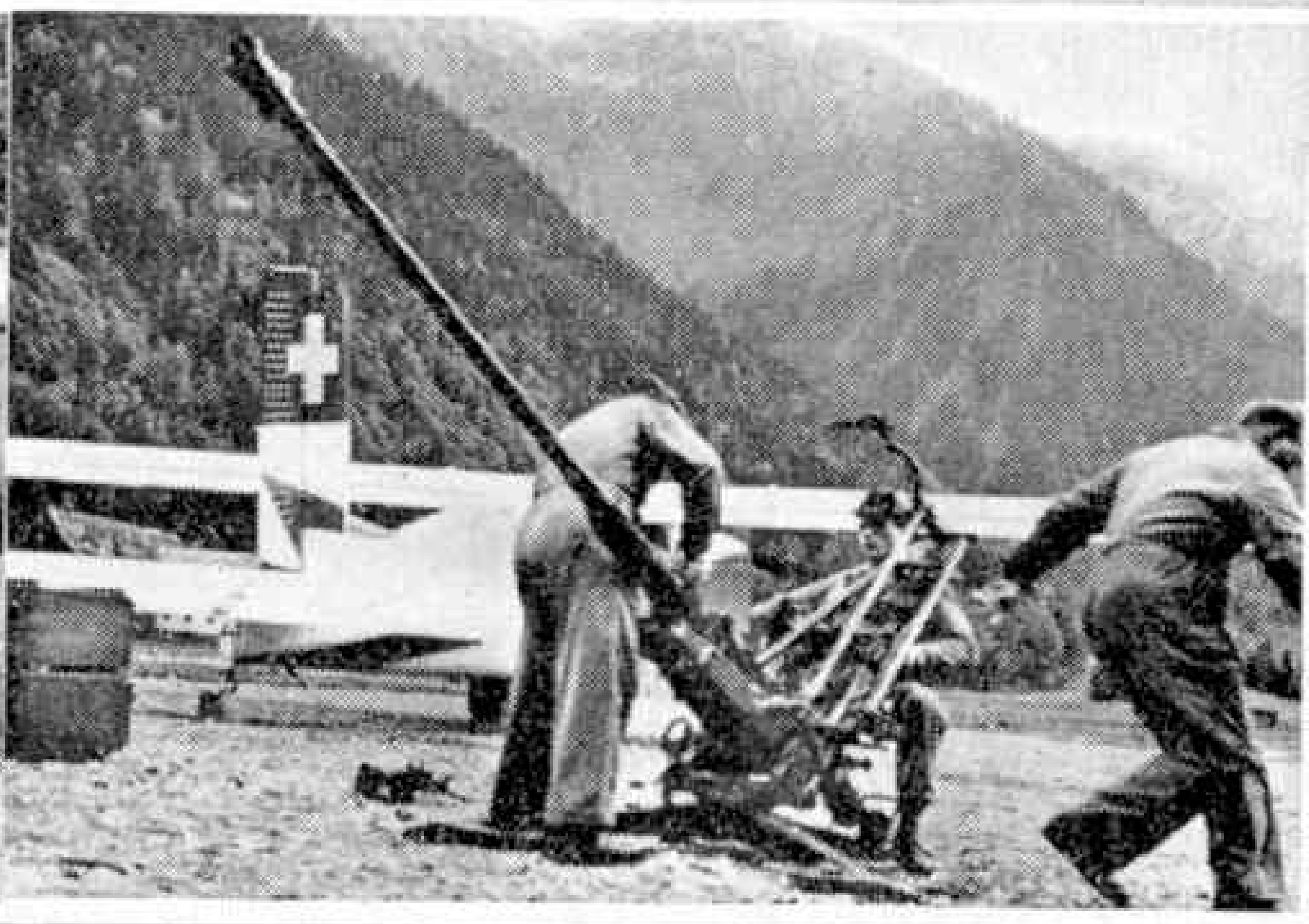
We ended this particular flight with a vertical bank around the end of the airfield at a height of less than 100 ft., followed by a landing run about the length of a cricket pitch.

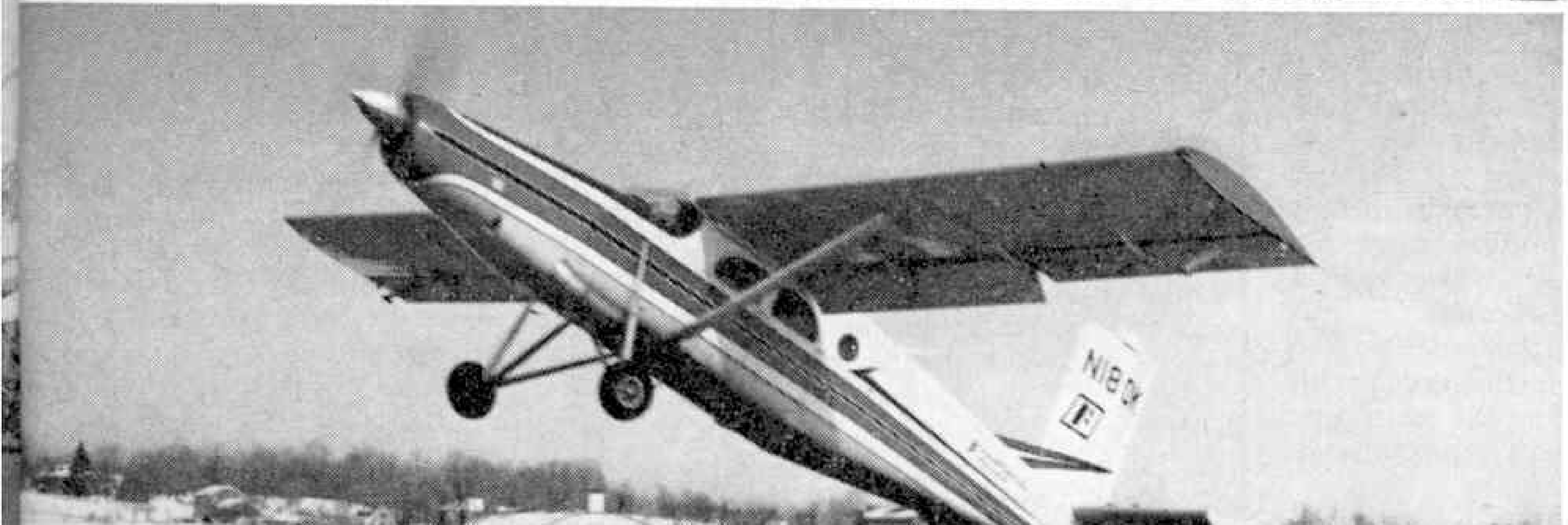
It was to be four years before I again came face to face with a Turbo-Porter. In those years, many other people learned of its qualities, and it entered service with airlines like Wien Alaska, who need sturdy, reliable machines for the kind of flying they do in the frozen north. New versions, with the Canadian-built 550 h.p. Pratt & Whitney PT6A-6 turboprop, and the American-built 575 h.p. AiResearch TPE 331-25D turboprop, entered production, side-by-side with the

These photographs give some idea of the capabilities of the Pilatus Turbo-Porter. It makes a pretty picture flying over the Alps and seems quite at home in its snowy surroundings, against a picturesque pine forest background. All those boxes

IN THE ALPS

One of the most manoevrable aircraft ever, it will almost stand still in mid-air, and its incredibly short take-off run makes it the ideal machine for mountainous terrain.





will go into the roomy fuselage, just as the 'Oerlikon' anti-aircraft gun came out of it. The last photo dramatically illustrates a typical Turbo-Porter take-off, vividly described by John Taylor in this article

Astazou-powered model and the original piston-engined Porter, which has a 340 h.p. or 350 h.p. Lycoming.

All versions are able to carry a pilot and up to nine passengers, in pretty rugged removable seats; but this is only one aspect of the aircraft's usefulness. Almost the whole of one side of the cabin is made up of a pair of doors which open up to give a clear space more than 5 ft. wide and 3 ft. 5 in. high, for loading bulky freight. What is more, there is a hatch in the rear wall of the cabin which can be removed, so that items like pieces of oil rig up to 16 ft. 5 in. long can be carried by pushing one end through the hole in the wall and into the rear fuselage.

If the pilot of a passenger model wants to clear part of the cabin for freight carrying, he can remove six of the seats and pass them through the same hole, for stowage in the rear fuselage until they are needed again. So, as you can see, the Turbo-Porter is a versatile aeroplane, as well as a 'go-anywhere' type.

Of course, one would not expect it also to break records speed-wise, on top of all its other accomplishments. Its job is to lift big loads at low cost from places where other aeroplanes cannot go, with wheel, ski or float undercarriage, as required. But the mere fact that it will take off with a full load in 142 yards and land in 75 yards enables it to set up some impressive door-to-door times.

The Turbo-Porters operated by Air-Alpes, in the French alpine region of Haute Savoie, can hop from Val d'Isère to Courcheval in under ten minutes. The two places look close on a map, but there are some high mountains in between and the journey by road takes about an hour. Nor is the 'airport' at Val d'Isère quite what one usually expects. . .

It is called an 'altiport' and the passenger who lands there by Turbo-Porter ski-plane can be excused if he finds the experience unique. Few other airports are situated on top of an 8,860 ft. mountain, with a 590 ft. stretch of snow for the main (and only) runway and a cable-car as the only airport-to-city-centre bus. Nor is the runway flat, as it has slopes of up to 30 degrees in places. Being atop Mount Solaise, it offers the intrepid passenger a view of Val d'Isère itself, 2,500 ft. below, as soon as the skis leave the snow.

Despite the fact that it has to accept such hair-raising exploits as day-to-day routine, Air-Alpes has built up a great reputation for safe, efficient operations with its two Turbo-Porters and one Piper Super Cub. In addition to carrying tourists from major airports in France and Switzerland to a network of mountain resorts, it ferries skiers to remote slopes, hauls supplies and equipment in minutes between villages that are hours apart by surface routes, and offers a speedy air ambulance service in emergencies.

Air-Alpes appears to have two of most things—two Turbo-Porters, two pilots (including the 'boss', Michel Ziegler), two ex-Air Force mechanics, two secretaries and two maintenance bases, each with a hangar, fuel supplies and passenger reception chalet, at Courcheval and Megève. Its staff is completed by a driver who takes over if the weather prevents flying for passengers in a hurry. With such tiny resources, it carries an average of 30-40 passengers each day in the busy season, which is surprisingly good when one takes into account the number of days on which bad weather makes flying from such lofty airstrips out of the question.

A few minutes after I finish writing this article, I shall be strapping my skis to the top of my car and setting out for Val d'Isère. With any luck, in two or three days' time I shall have a third meeting with my old friend the Turbo-Porter and learn again how exciting *real* flying can be.

Flipper—The MM Submarine

by Ron Warring

IN this unusual model we have endeavoured to combine realistic appearance with very simple and straightforward construction and also avoid, as far as possible, the use of more expensive 'block' sizes of balsa. Balsa is employed throughout for all the parts (with a few exceptions) because it is easy to work and also produces the most favourable weight distribution. This is important, for our sub is a real working model.

The size has been selected as the largest which can be produced economically from standard balsa sizes, giving a model approximately 35 in. long. Again this is an advantage from the performance point of view. Small model submarines are really only toys and have a very limited performance. The 'M.M.' sub is large enough to install radio control, if you want.

The full size plan shows all the main parts full size, and also full size views of the side and plan elevations of the complete model. The latter are split at the line X-X as the model is too long to be drawn complete on a single plan sheet.

The only time you need to refer to the full length of the plan is for making a tracing of the deck outline and bottom outline. These are the thick black outlines on the plan view. Make sure that you have a long enough piece of tracing paper to start with (36 in. long) and trace the front portion of the deck and bottom outlines up to the limit of the plan, drawing a vertical line at this point. Turn the plan over, locate this line on the left hand side of the second plan sheet and complete tracing the deck and bottom outlines. Note that when tracing the bottom outline you should also mark on the bulkhead positions.

Construction of the model from now on will be described in progressive steps. It is important to follow these in order, otherwise you may run into difficulties at a later stage. For example, unless you fit the studding to bulkheads 3 and 4 before you fit these formers in place you will have nothing with which to secure the main hatch when you have completed the hull.

1. Trace the bottom outline and bulkhead positions on to a 36 in. by 3 in. sheet of ½ in. thick hard or medium hard balsa—see Fig. 1. (Sheet of this thickness usually tends to be cut from soft rather than hard grade, so you may have trouble in locating hard stock. Pick out the hardest sheet you can find.) This should then be cut out accurately with a *saw*, not a modelling knife, as this will give a truer cut. The curves involved are quite moderate so you can use a stiffback saw as the easiest method of ensuring a square cut.

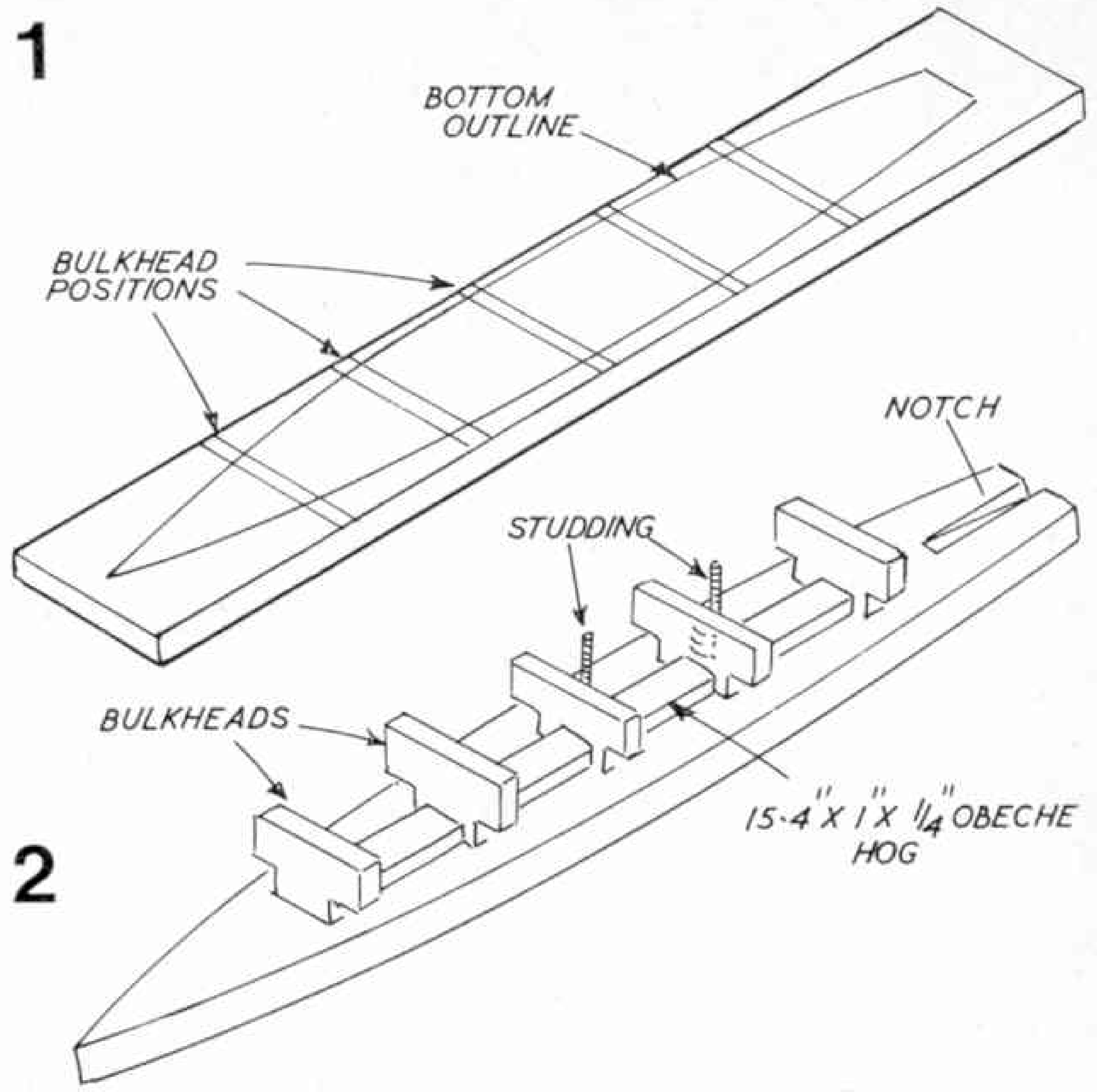
2. Trace all the bulkhead shapes from the plan on to ½ in. sheet balsa and cut out accurately, again using a stiffback saw. If you have any trouble in cutting accurately, cut outside the true outline required and trim down with sanding sticks of glasspaper.

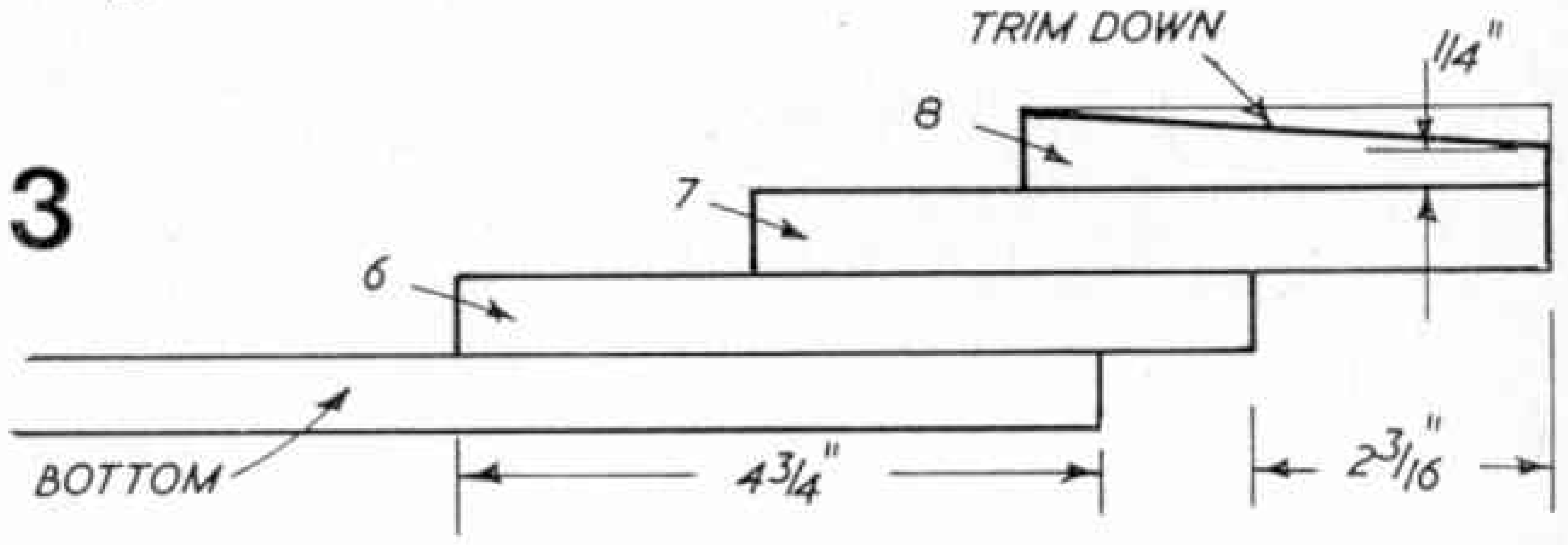
3. A 2¼ in. length of 4BA brass studding must now be fixed to the centre of each of bulkheads 3 and 4. Studding is simply like a screw without a head. The bulkhead plan drawing shows the position of the studding which is sewn in place with a 1 in. length of studding projecting from the top of the bulkhead. Finally add a coating of cement to help hold the studding in place, or, better still, a coat of epoxy resin.

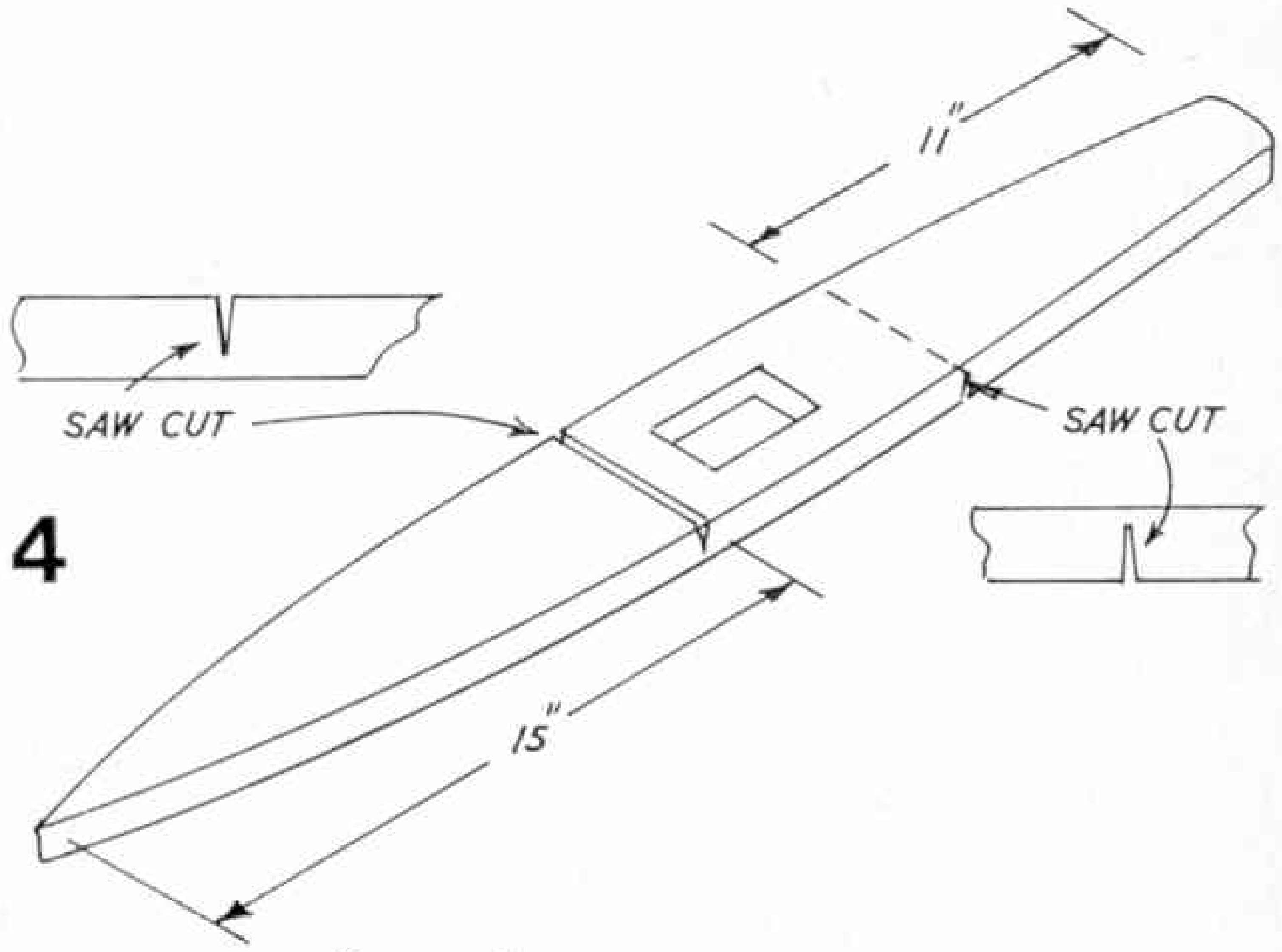
4. Now cut the hog from 1 in. by ¼ in. obeche. This should be cut to a length of 15·4 in. and cemented along the centre of the bottom so that it runs from the aft side of bulkhead 1 position to the forward side of bulkhead 5 position. All the bulkheads can then be cemented in position to complete this assembly as in Fig. 2.

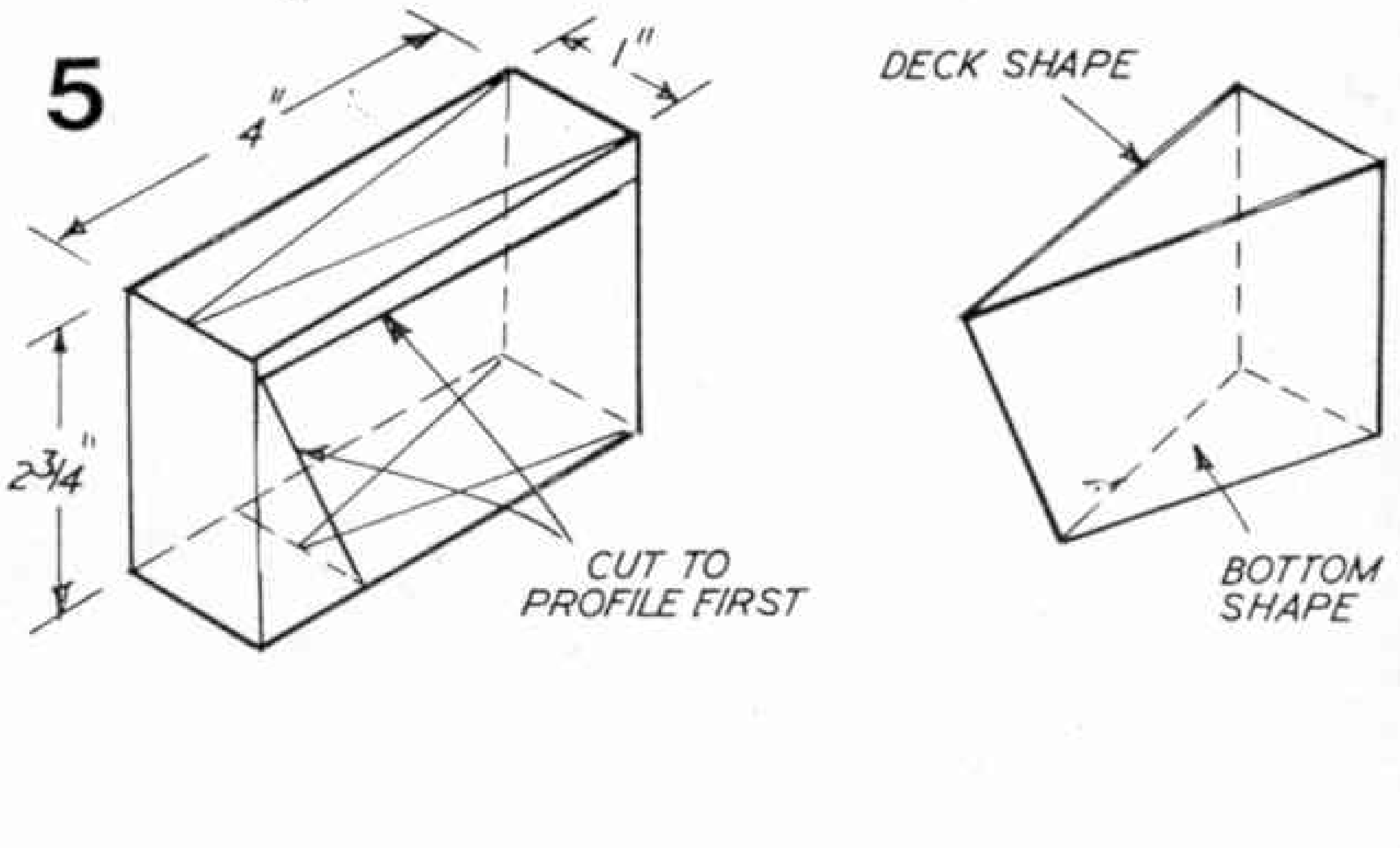
5. At this stage you must fit the stern tube which will carry the propeller shaft. Refer to the side elevation plan drawing of the rear of the hull. Cut a notch in the aft end of the hull bottom until the stern tube will rest at the correct angle when inserted through the hole in bulkhead 5 and the notch in the bottom. Then fill in this notch with scrap balsa and secure the stern tube to bulkhead 5 with epoxy resin adhesive.

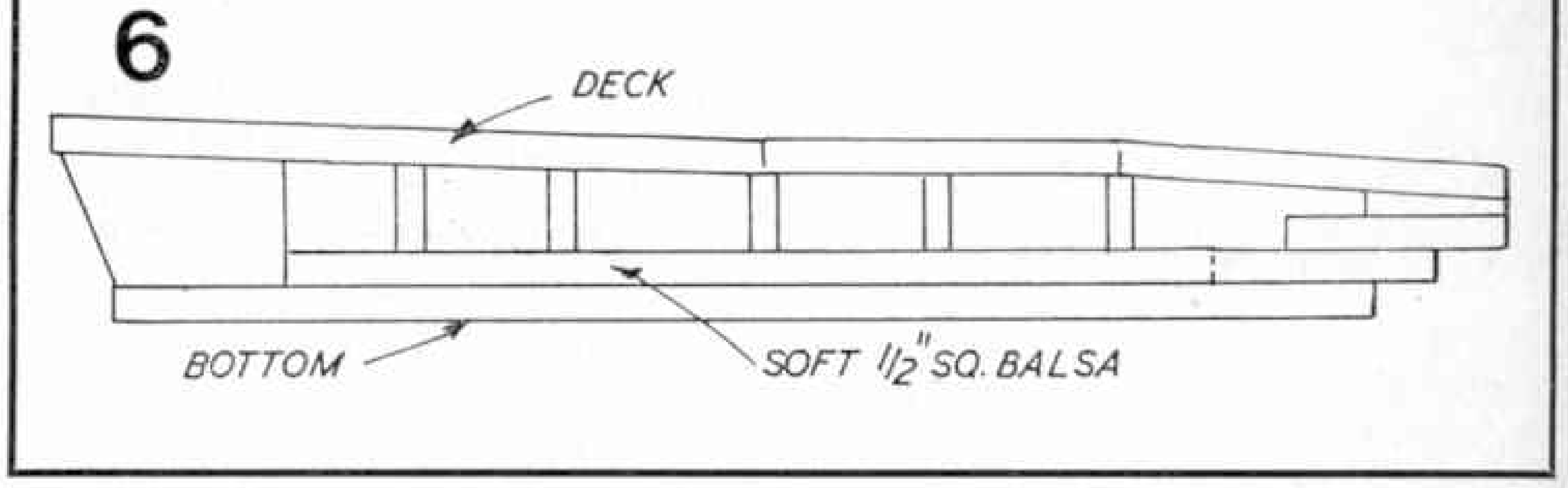
6. Cut out parts 6, 7 and 8 from ½ in. sheet balsa. These are cemented in place as shown in Fig. 3. You can work to the dimensions shown in this figure, or mark the position of these parts directly off the plan. Note that the bottom of part 6 will have to be notched to fit over the stern tube, otherwise assembly is











quite straightforward. Leave to set and then trim off the top of part 8 at an angle so that its depth at the rear end is reduced to $\frac{1}{4}$ in. (You can, if you prefer, do this trimming before cementing part 8 in place.)

7. The deck outline is now traced onto $\frac{1}{2}$ in. balsa sheet and cut out. Note that there is also a hatch opening to cut out, this being shown on the plan view drawing.

Mark 15 in. back from the front and draw a line across the top of the deck. Mark 11 in. in from the rear end and draw a line across the bottom of the deck. Shallow notches are then cut with a saw at these points, as shown in Fig. 4. These represent the point at which the deck angle changes and enables the thick sheet to be bent without breaking.

8. The bow block must now be cut to shape. Starting point is to cut a block 4 in. long by $2\frac{3}{4}$ in. deep and 1 in. thick. You can cut this from 1 in. block or cement two 4 in. by $2\frac{3}{4}$ in. pieces of $\frac{1}{2}$ in. sheet together (the latter will be spare from the material used for cutting out the bulkheads). Mark out and cut the block to profile shape first (traced off the side elevation drawing). Then mark the deck shape on the top face and the bottom shape on the bottom face and finally trim down the block to the correct wedge shape as shown in Fig. 5.

9. The bow block is cemented to the hull bottom. Fill the saw cuts made in the deck with cement, crack bend to shape and cement the deck in place, as shown in Fig. 6. Bending should close the notches and squeeze out surplus cement. Finally, cement in two lengths of soft $\frac{1}{2}$ in. square balsa on each side, as shown. It does not matter if these do not conform exactly to the curve of the bottom at the bow end as you can fair them off later, but if you use *soft* $\frac{1}{2}$ in. square you should be able to follow the curve very closely.

10. At this stage, it is necessary to install the motor and wiring for the battery. A medium power motor of cylindrical shape is advised as this will be easiest to accommodate in the rather restricted motor compartment (between bulkheads 4 and 5). The motor must be lined up with the propeller shaft, using a standard flexible coupling as a connection. Use wedges cut from scrap balsa to line up the motor correctly and, if necessary, cut away the hog (this will be necessary if the motor is more than 1 in. diameter). The motor can then be permanently fixed with a strap of thin aluminium secured to the $\frac{1}{2}$ in. square strips on each side. No mounting details are shown on the plan since these will vary with the type and size of motor used. Mounting should, however, be fairly obvious, provided you work on the principle that the motor should be blocked up to the correct angle with scrap balsa, similarly wedged so that it cannot move sideways and then finally secured with a simple strap or other means.

The space between bulkheads 3 and 4 is the battery compartment. The batteries can simply lay in this compartment, held in place with plastic foam packing. A switch should be fitted to the underside of the deck immediately in front of the hatch cut-out. Complete *all* the wiring at this stage, i.e.

(i) one lead from motor to switch

(ii) one lead from the other side of the switch to the battery connection

(iii) one lead from the other side of the motor to the other battery connection.

Both leads to the motor are taken through bulkhead 4. Seal these holes with cement after passing the wires through.

11. You are now in a position to add the sides to complete the basic hull assembly. These sides are cut from $\frac{1}{4}$ in. sheet balsa, but first fair off the assembly with glasspaper wrapped around a block to make sure that the sides will fit snugly. For example, bulkhead 1 will need fairing off to conform to the curve of the deck and bottom at this point. It is very important that you do fair off the main assembly properly as a good fit for the sides is essential to ensure a watertight hull.

For the sides you need two 36 in. panels of 4 in. by $\frac{1}{4}$ in. medium balsa which are fairly flexible and can be bent end to end. Avoid quarter-grain sheet which is still and rigid. It is also advisable to glue the sides in place with Cascamite rather than balsa cement as this is fully waterproof adhesive, whereas balsa cement is not. The slower drying time of Cascamite will also ensure that there are no 'dry' spots when you have finally positioned the sides.

Before you start gluing up, first cut the $\frac{1}{4}$ in. sheet to the bow profile shape—i.e. just shape the first 6 in. of the sheet—the rest you can leave unshaped. Offer the two sides up and chamfer the inside faces slightly for a really snug fit in front of the bow block. You are now ready for gluing up.

Apply adhesive generously to all the joint faces, position the sides at the front and clamp in place. Then clamp or pin down over the rest of the hull length. Leave for several hours to set (in the case of Cascamite, leave overnight).

12. All that now remains to be done to complete the hull is to carve and sand to final section. Study the three typical section drawings on the plan to see the shape required. The deck plan is left absolutely flat, with the top of the sides just rounded into it. The bottom of the hull, on the other hand, is well rounded off.

The bottom of the stern is trimmed to the concave outline shown on the plan and then rounded off on the underside. The transom is also rounded off. Work to what appears to be a pleasing shape.

After sanding smooth the hull should then be given several coats of sanding sealer, sanding down again between each coat, until you have got a really smooth, almost glass-like finish. Fill any dents or surface imperfections with filler paste as you proceed. When finally satisfied that the hull is as smooth and even as you can get it, give several coats of medium grey *flat* paint or dope. After the final coat has been allowed to dry for at least twenty-four hours, stick masking tape around the colour line marked on the plan and paint the hull bottom matt black (one coat).

Next month: the finishing details and fitting-out.

The Ceiling Walker

THIS model has been specially designed for indoor flying in any reasonable size room. When released after winding up the model should climb straight up, helicopter fashion, until the 'spike' mounted on the upper rotor hub hits the ceiling. The model should then stay in this position until the power has run out, when it will start to wobble and descend. Of course, the higher the room the better as the model can then achieve a longer 'free flight' time. If the room is high enough, in fact, you should be able to adjust the power of the rubber motor so that the model will climb slowly to ceiling height, remain there for a few seconds and then descend very slowly, still under power.

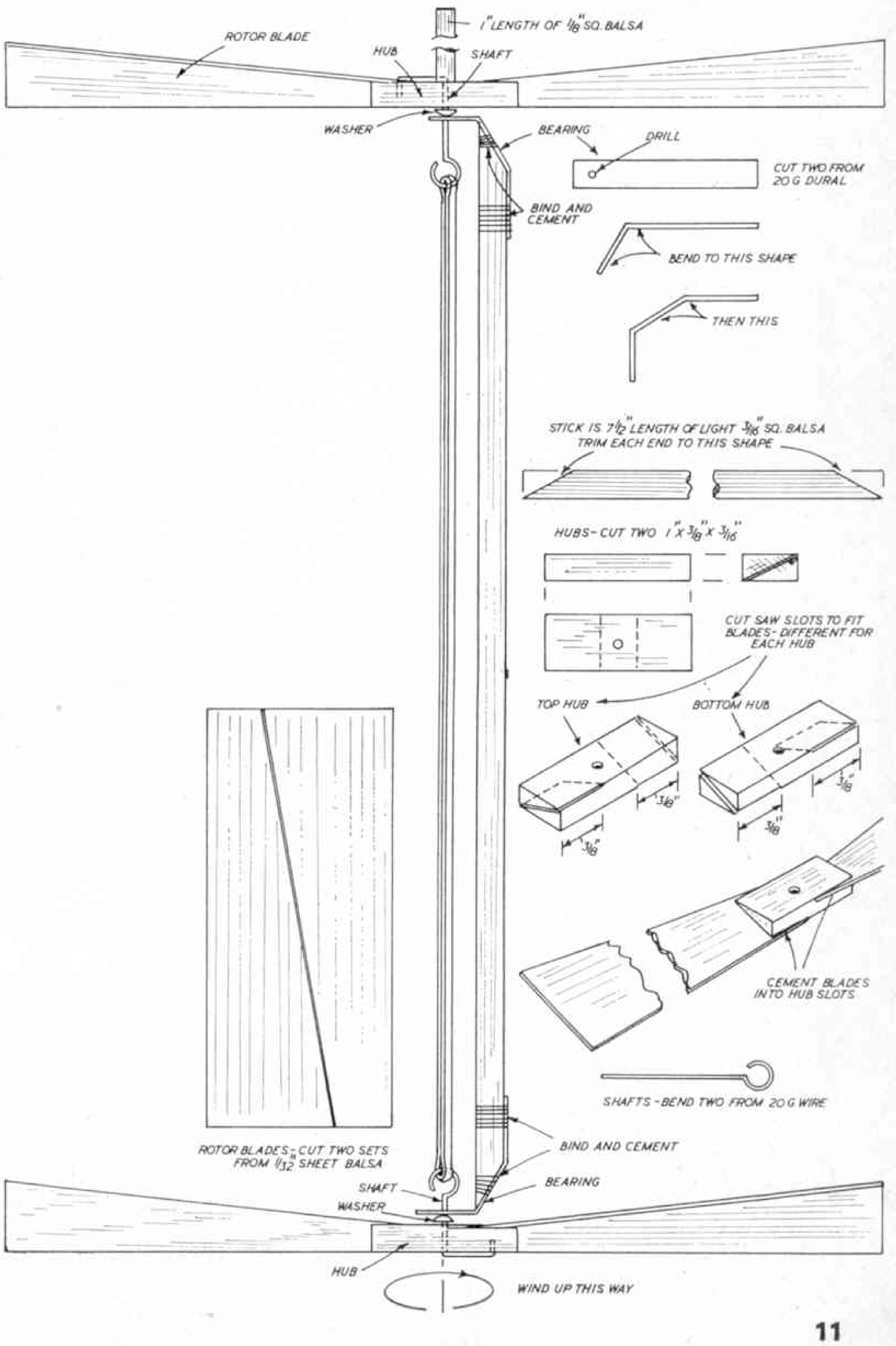
Construction is very simple. Start by making two bearings from 20 gauge dural sheet, as shown in the detail sketches. If you cannot find any dural, 20 gauge brass strip will do, provided it is reasonably hard (e.g. the brass terminal strips off an old $4\frac{1}{2}$ volt flat battery).

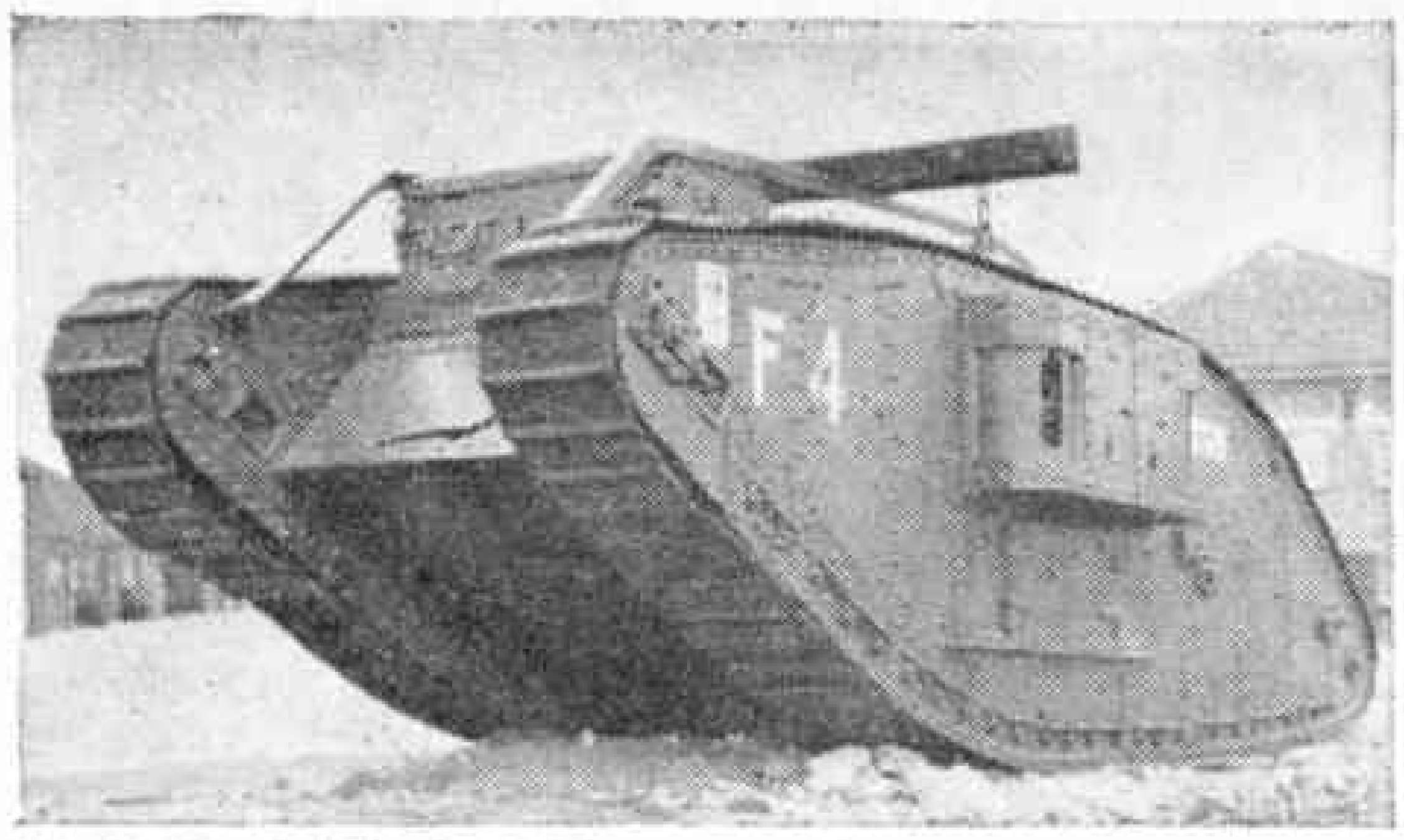
Prepare the stick by chamfering off each end at an angle, as shown, and then bind the bearings in place with cotton. Finally secure with a generous coating of balsa cement round the bindings.

The two hubs are both 1 in. long, cut from $\frac{1}{8}$ in. by $\frac{3}{16}$ in. balsa strip (or scrap $\frac{3}{16}$ in. sheet balsa). Note how these are saw cut at an angle to produce slots into which the rotor blades fit—and how 'opposite' angles are used on the top and bottom hubs. This is quite easy to do, but if the saw cuts do not work out accurately, cut another hub and try again.

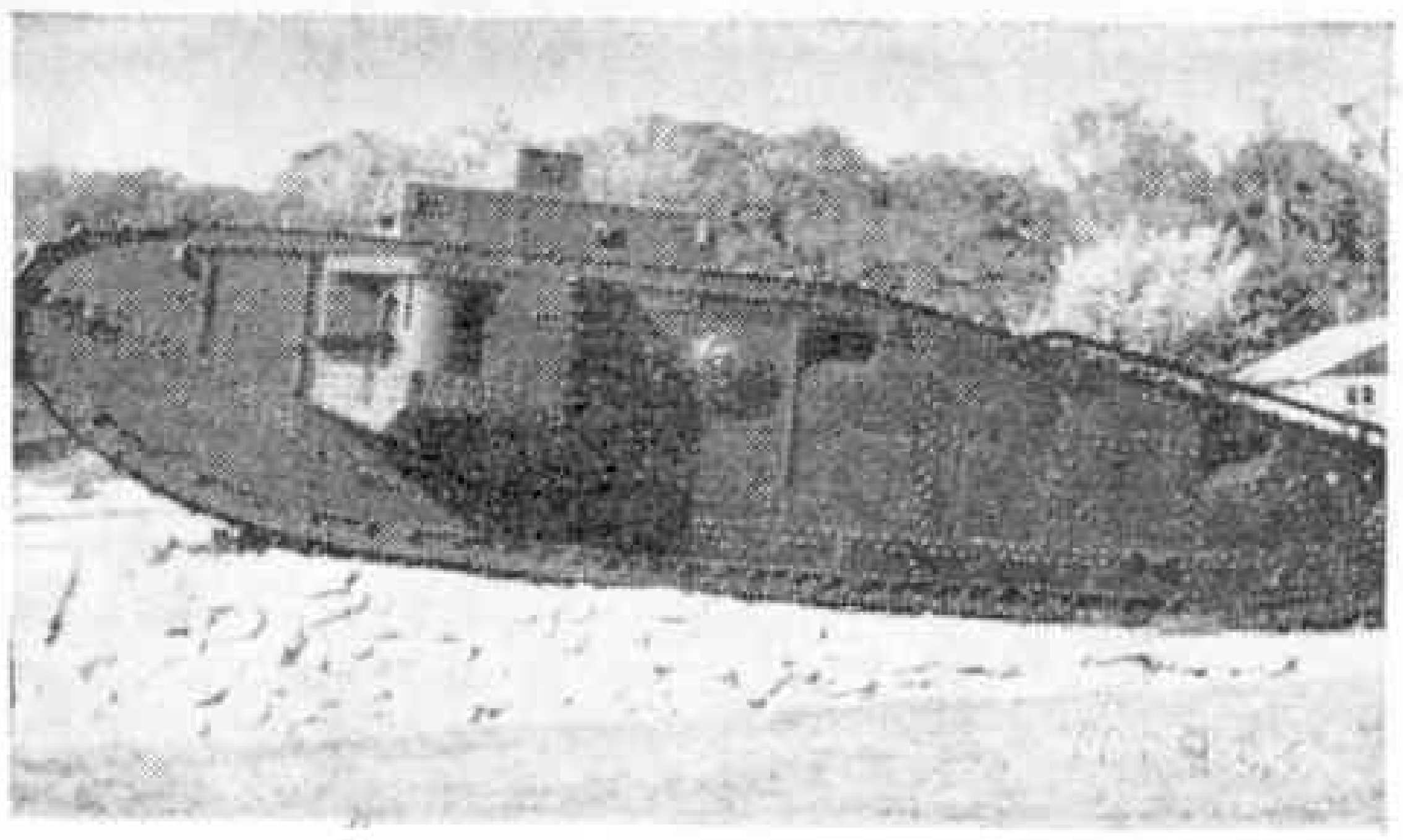
The rotor blades are cut from $\frac{1}{32}$ in. sheet balsa to the pattern shown—i.e. a 3 in. by $1\frac{1}{4}$ in. panel of $\frac{1}{32}$ in. sheet will make two blades when cut as shown. The blades are then coated with cement at the inner ends and pushed into the hub slots to complete the two rotors. Note how the bottom of the blades should be horizontal—i.e. the complete rotor can be lined up by laying over a flat surface once the blades have

Continued on page 25

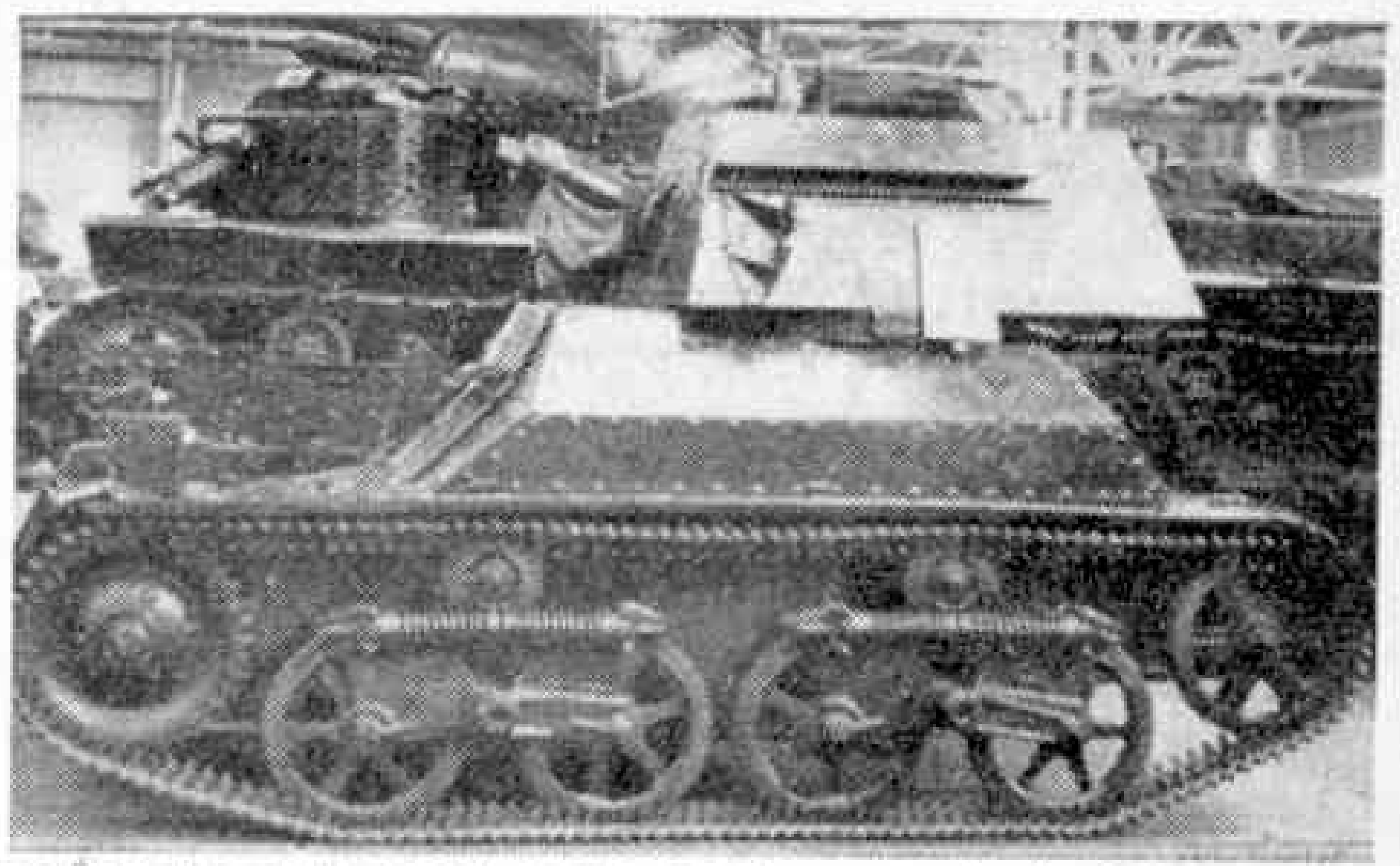

1" LENGTH OF 1/8" SQ. BALSA
ROTOR BLADE
HUB
SHAFT
WASHER
BEARING
DRILL
CUT TWO FROM 20 G DURAL
BIND AND CEMENT
BEND TO THIS SHAPE
THEN THIS
STICK IS 7½" LENGTH OF LIGHT 3/16" SQ. BALSA
TRIM EACH END TO THIS SHAPE
HUBS - CUT TWO 1" X 3/8" X 3/16"
CUT SAW SLOTS TO FIT BLADES - DIFFERENT FOR EACH HUB
TOP HUB
BOTTOM HUB
3/8"
3/8"
3/8"
3/8"
CEMENT BLADES INTO HUB SLOTS
SHAFTS - BEND TWO FROM 20 G WIRE
ROTOR BLADES - CUT TWO SETS FROM 1/32" SHEET BALSA
BIND AND CEMENT
SHAFT
BEARING
WASHER
HUB
WIND UP THIS WAY



'Tank Mark IV' of 1917 stands in front of the Museum; it was an infantry support tank armed with four machine guns



This 'Mark VIII' of 1918 was an improvement on earlier tanks; it was armed with two 6 pounders



The 'Vickers' Light Tank Mark II' was typical of light tanks of the Thirties. In the background can be seen the 'Independent' multi-turreted tank

A visit to the R.A.C. Tank Museum with H.L.D.

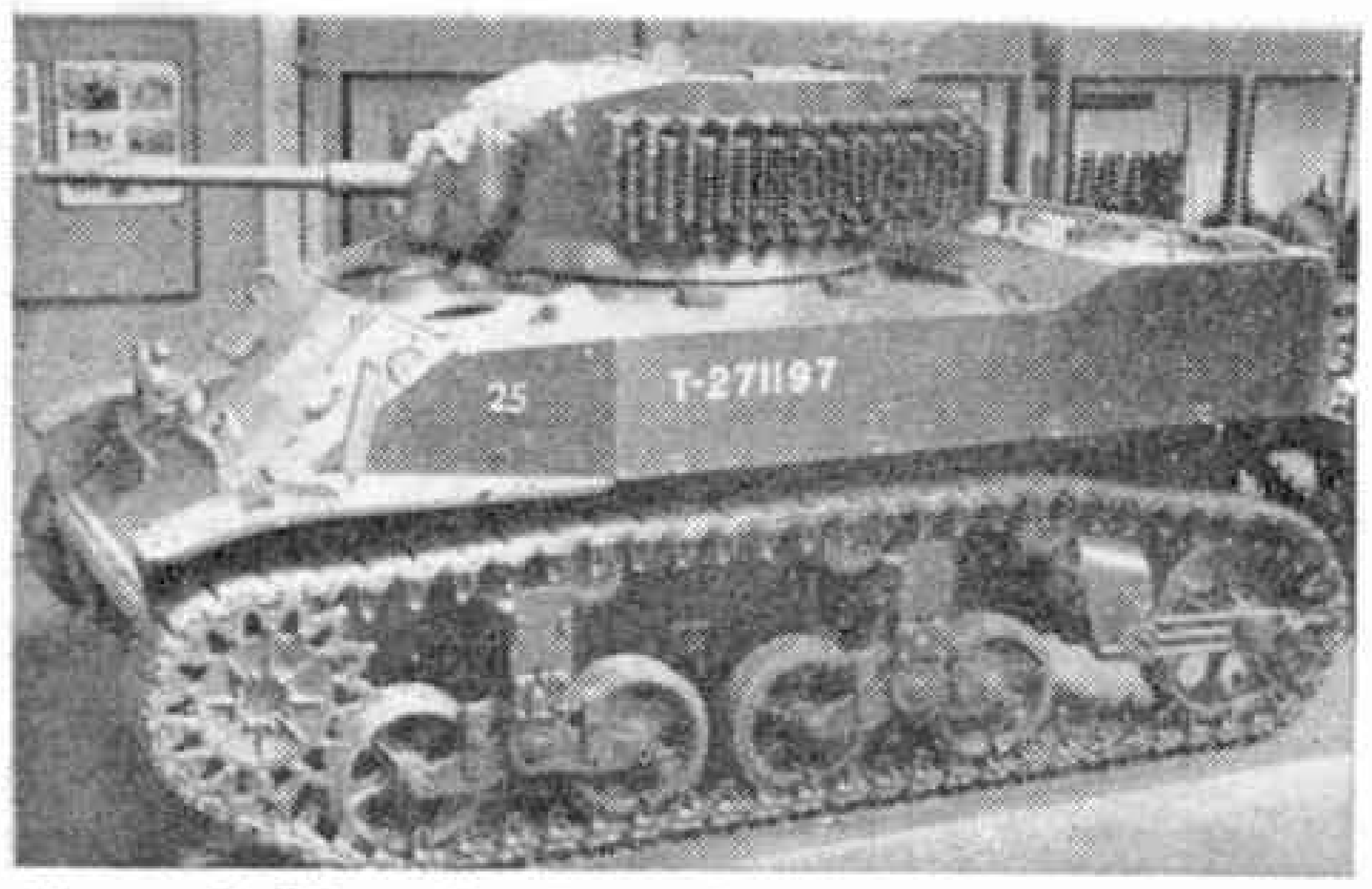
The study of Armoured Fighting Vehicles is a fast-growing hobby, and this month MM Battlegaming expert H.L.D. describes a visit to the R.A.C. Tank Museum at Bovington in Dorset, where tanks of all types can be seen and studied. The photographs are by courtesy of Warpics, and the article will be concluded next month.

THIS month we diverge from the normal article associated with Battlegames. Our subject will be of more general interest, and we hope it will appeal to all Meccano Magazine readers, but especially those who study military equipment as a hobby.

The Tank has been the focal point of interest in land armies since its successful debut in the First World War. By the start of the Second World War, the tactical use of tanks had undergone great changes. Germany's use of massed tanks in Panzer Divisions for 'Blitzkrieg' was the first demonstration of this change. Other nations were soon to follow, and in the following few years of the War there were a multitude of designs produced which always endeavoured to better the tanks of the opponent. The advent of long range missiles as the prime offensive weapon has not lessened the importance of the tank, but has led to its closer co-operation with other forces in an overall Weapons System. New types are appearing all the time—America is introducing to service a missile firing tank and all the powers are working on more advanced designs.

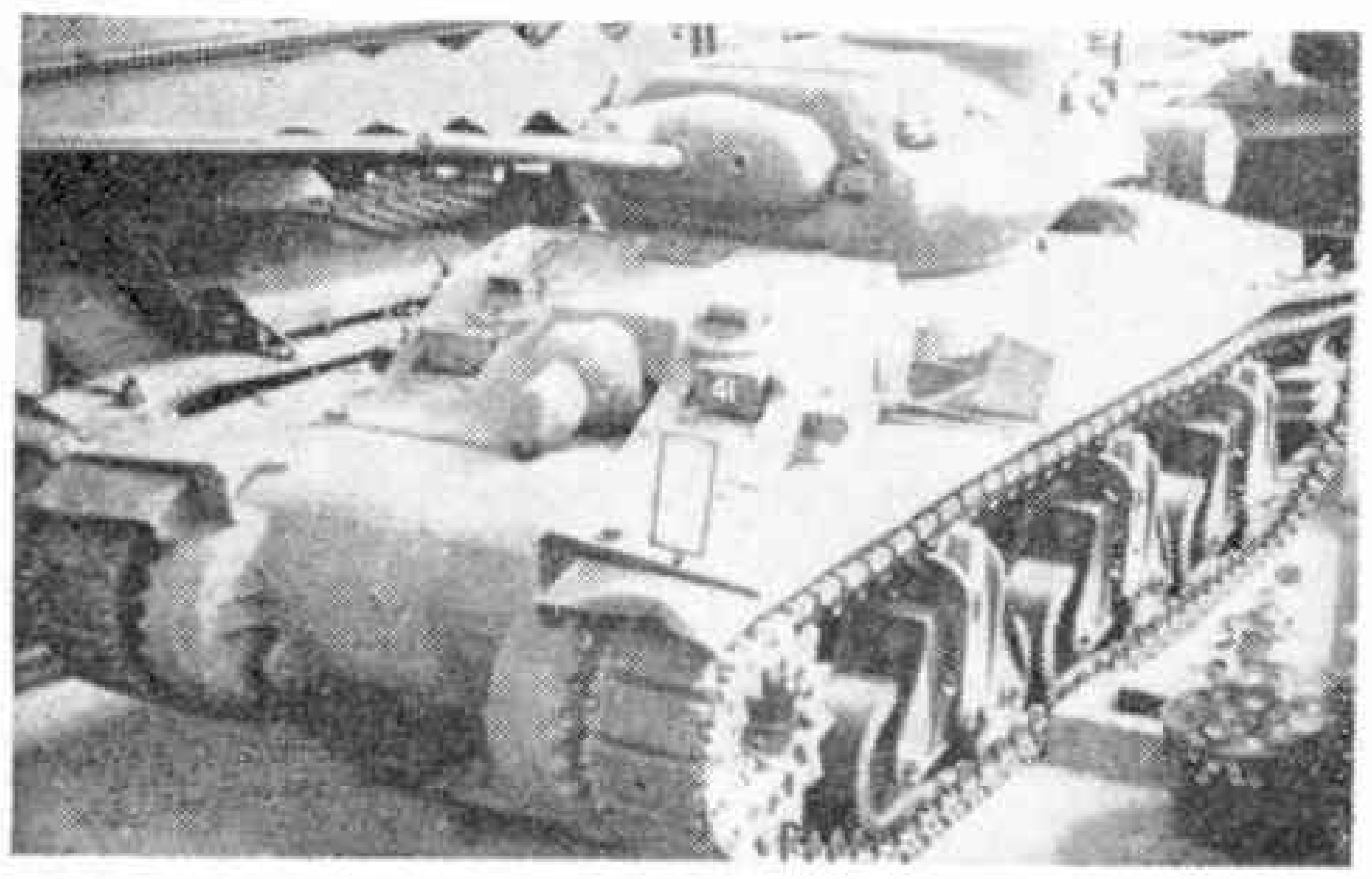
The hobby of studying Armoured Fighting Vehicles is relatively new. The introduction of models and a number of publications has stimulated the interest. Collection of books, drawings and photographs is, of course, the heart of the whole hobby. But a tank is something far different to anything seen in normal life. No bulldozer, no matter how big, can be compared to a heavy battle tank. Therefore, to really appreciate the subject one should try and get to see the real thing.

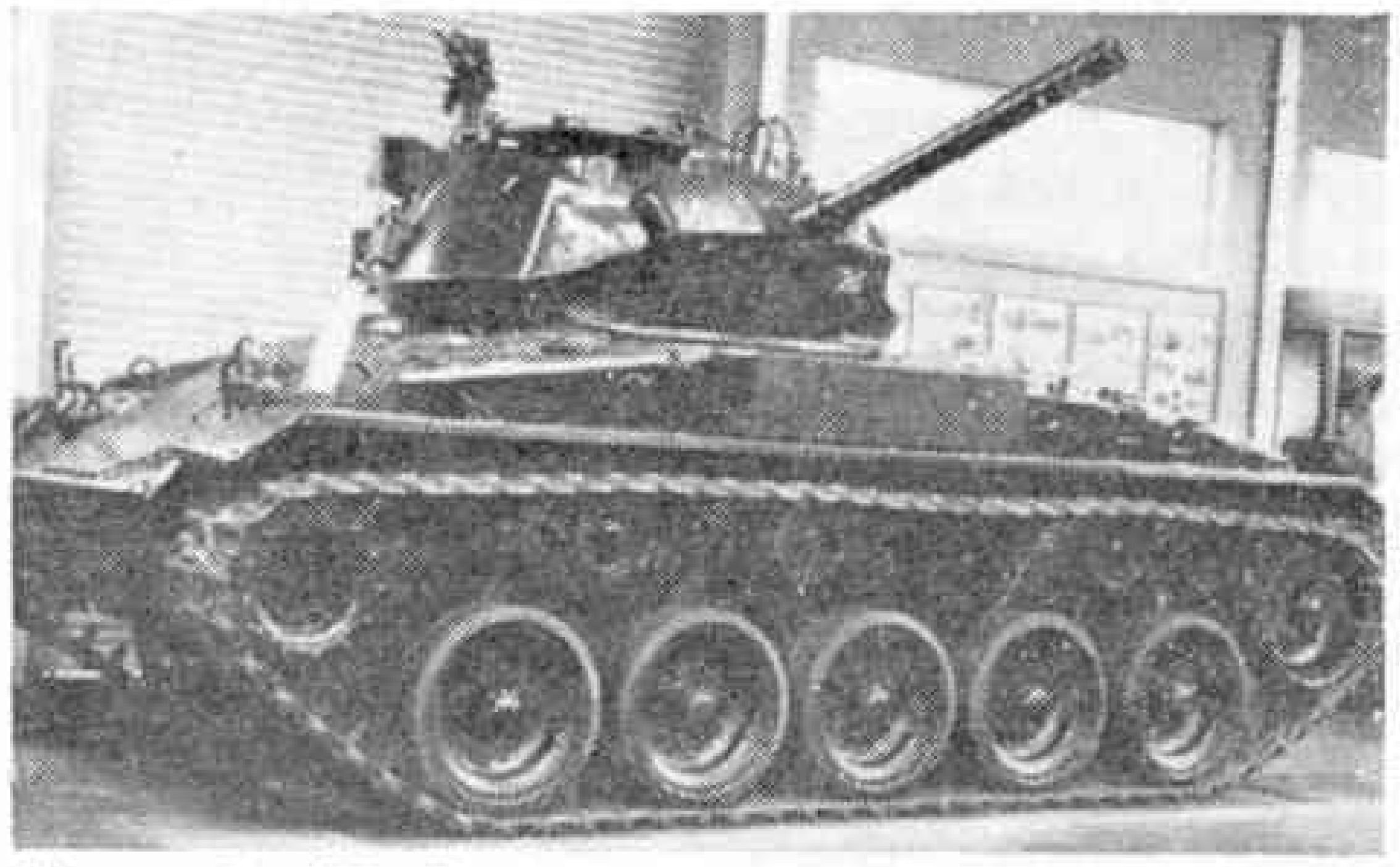
The R.A.C. Tank Museum at the Bovington Camp, near Wareham, in Dorset, gives everyone this opportunity. The Camp, which is the headquarters of the Royal Armoured Corps, is situated in the Bournemouth area, so anybody who is



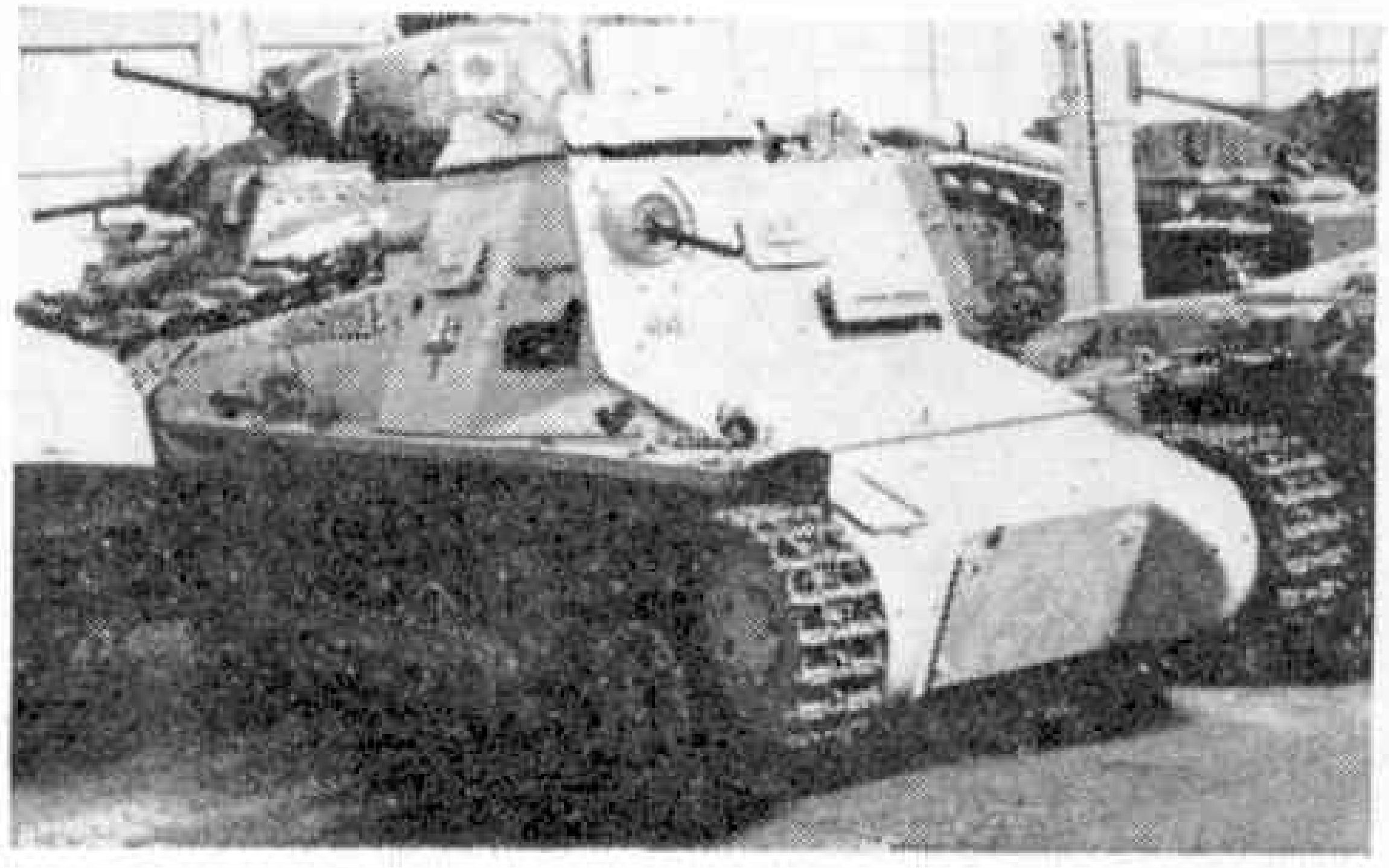
Above: the 'Stuart' or 'Honey' Mark VI

Below: the Australian 'Sentinal'

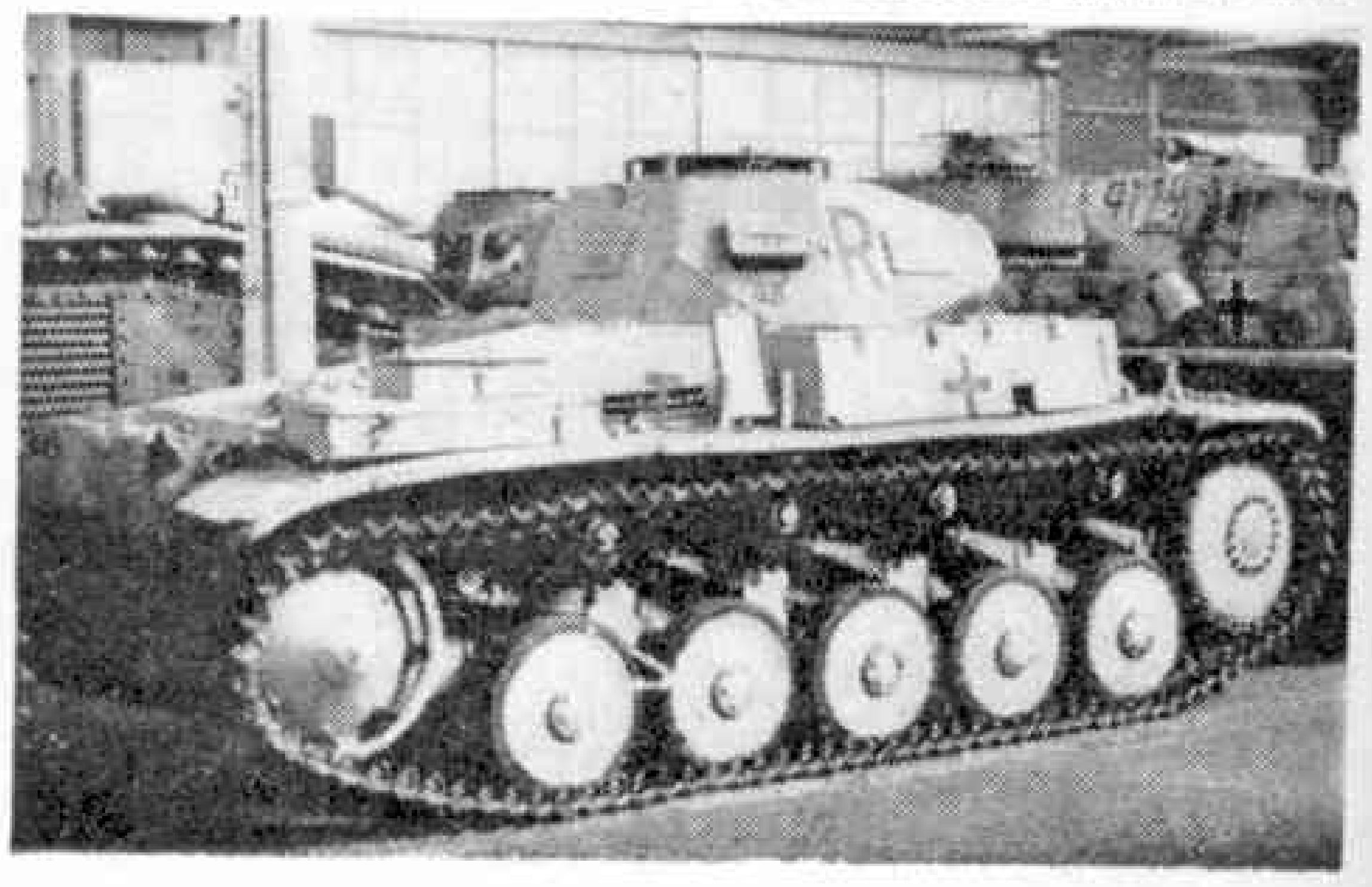


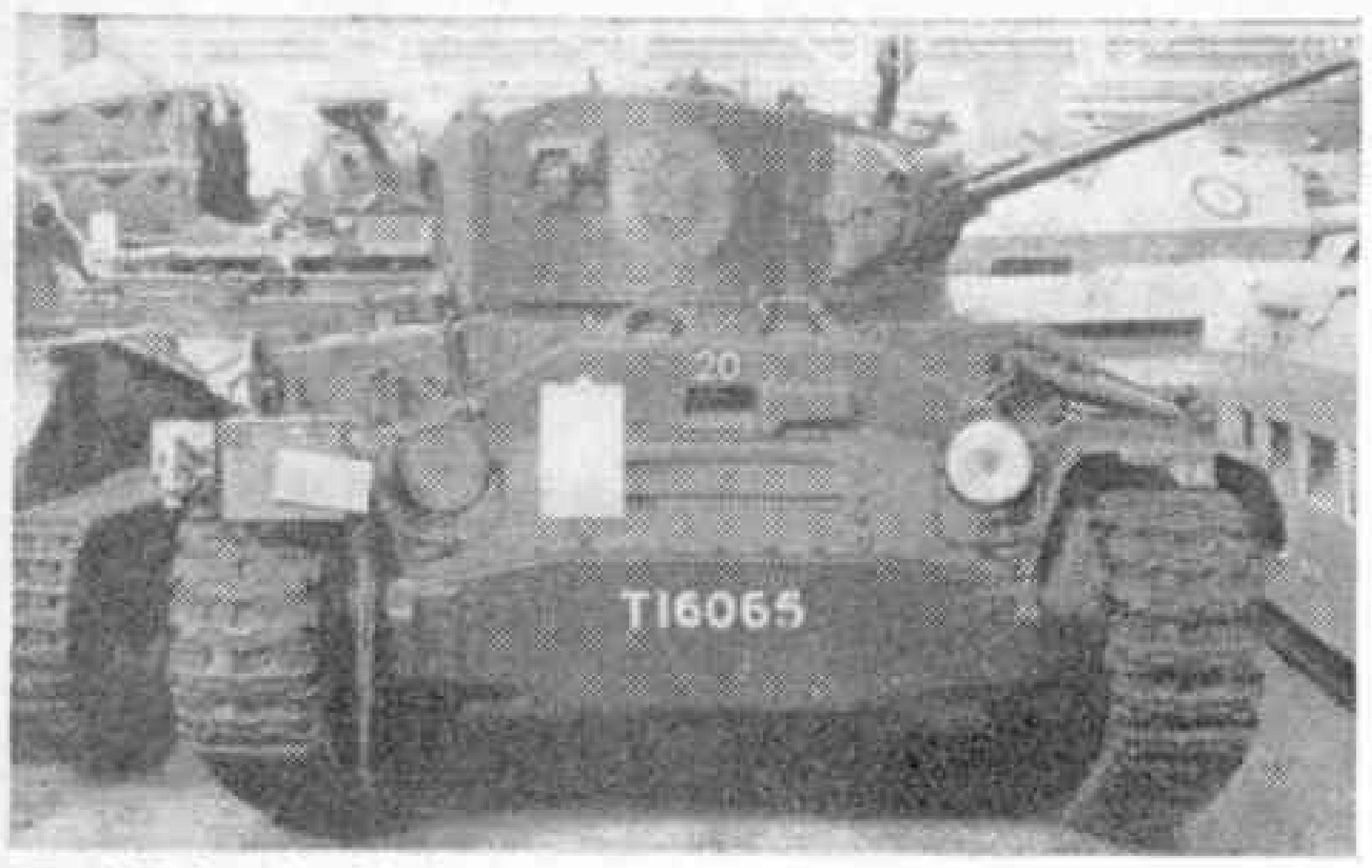


Above: the 'Chaffee' is still in service with many armies. Below: the German Pz Kw I model B, modified to a commander's tank

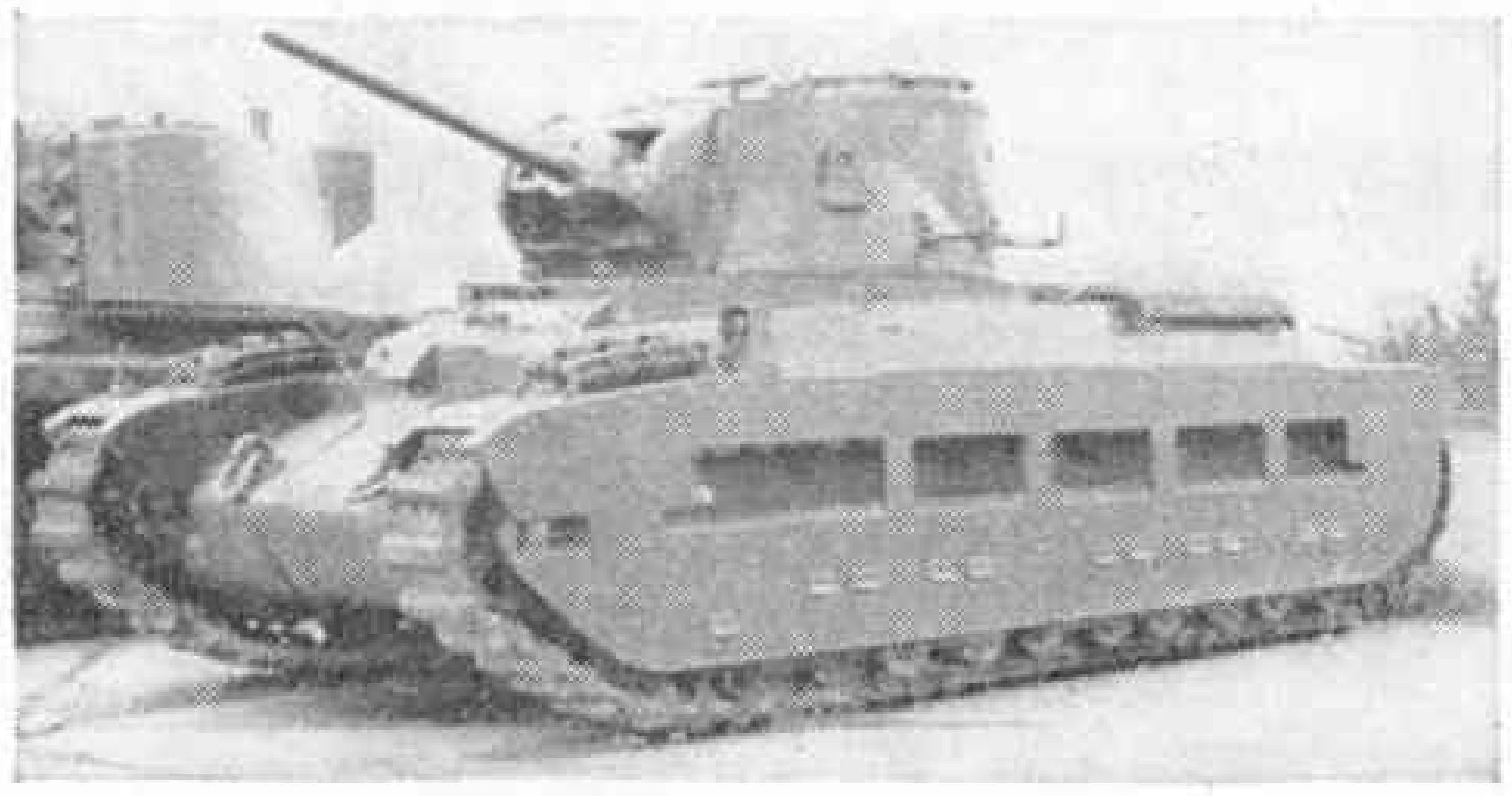


The Pz Kw II light tank armed with a 20 mm. cannon was the most numerous tank in the invasion of France. This one was a reconnaissance version captured in the Desert

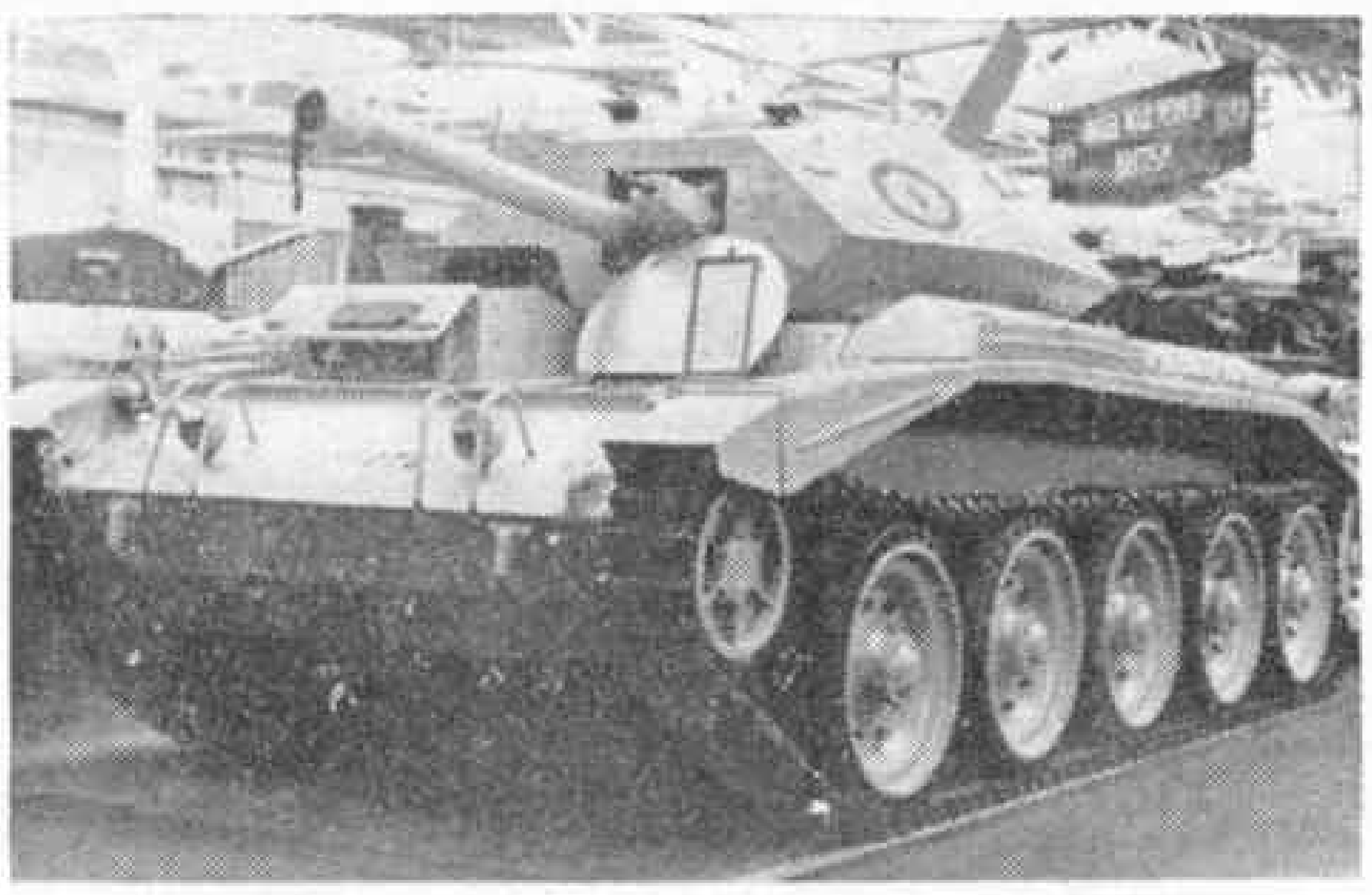




The 'Valentine' infantry tank



This was the second 'Matilda' at the Museum, it is now in the Imperial War Museum, Lambeth Road, London



The 'Crusader' Mark III armed with the 6 pounder gun

holidaying in the South should be able to make a detour to visit it. Londoners will find that they are able to make the trip by train in one day. Leaving in the morning, they arrive in time to have the full afternoon at the Museum and catch a train back to London that evening. The station is at Wool village, some two miles from the Museum.

Opening hours are from 10 a.m. to 12.30 p.m. and 2 p.m. to 4.45 p.m. on weekdays; Sundays, Saturdays and Bank Holidays from 10.30 a.m. to 12.30 p.m. and 2 p.m. to 4 p.m. The only time the building is shut is during the Christmas period. There is a shop there, in which everything concerning tanks can be purchased; the Museum guide, postcards, models, camera film, Regimental Histories, and a large range of excellent books on the subject of A.F.V.s. The Museum has an extensive collection of photographs of all types of vehicles other than those on exhibition, and details can be had on request.

Just to the north of the Museum are the training grounds where the British tank men learn their skills. It is best to try and visit the Museum on a weekday as there is then the possibility that some tanks will be practising near to the public roadway. All types are to be seen and lucky people may be able to take their own action photographs.

For one reason or another, many readers will be unable to visit the Museum this year, so for their benefit, and to assist those planning a trip, we will give a brief summary of what one can expect to see amongst the one hundred and twenty odd vehicles on display.

On entering the main hall—admission is free—it is best to get the guide which costs only sixpence. There are six major groupings of numbered exhibits to assist the visitor, but each vehicle bears a plaque giving technical details and comments. Deservedly, first in line are the early tanks, including the Tank Mark I, which was, in 1916, the first type to see service. The 'Whippet' was considerably different and was a fast medium tank that appeared in 1918, its armour being three machine guns. The fiftieth anniversary of the Battle of Cambrai, the first large tank engagement, is to be celebrated later this year. In the Museum there is a particular trophy won by the tanks on that occasion—a German 77 mm. gun that was used in the anti-tank role.

Group Two is made up of the vehicles that were introduced in the very interesting inter-war period when the tank went through its growing pains. Large numbers of experimental designs were developed, and some very strange ones, such as the Vickers 'wheel-cum-track' were built. This vehicle had both wheels and tracks; when it was on a roadway the tracks were hoisted up, leaving it to run on the wheels alone. The 1926 experimental tank, 'Independent', deserves the title of 'land battleship', for it has no less than *five* turrets.

Next, we come to the tanks used in the early part of the Second War. The 'Matilda' with 78 mm. of frontal armour, and armed with the 2-pounder gun, was superior to the German tanks until they introduced heavier guns and armour in 1941. Another successful infantry tank was the 'Valentine'. The 'Crusader' was a very fast cruiser tank, at first armed with the 2-pounder, but the model on display is a Mark III with the 6-pounder gun. During the desert campaign, large numbers of American tanks were supplied to the British and Commonwealth forces. The light tank 'General Stuart' or 'Honey', was a very fast, robust vehicle, armed with a good 37 mm. gun—a Mark VI is on display. The Stuart was superseded in 1944 by the 'General Chaffee', a very modern design armed with a 75 mm. gun; many of the smaller nations still use them to this day.

Two very large vehicles are next to catch the eye. The aptly named 'Tortoise' was designed as an impregnable mount for the 32-pounder gun that appeared in 1945. The huge amounts of armour made the weight 76 tons and limited the speed to 12 m.p.h. Its development was abandoned when the war ended. The amphibious troop carrier, 'Buffalo', will be familiar to those collecting the Airfix models. However, its size is somewhat deceptive in model form. Another amphibious vehicle is the 'Sherman DD' (duplex drive). This was a standard tank, with propellers, around which a canvas screen was erected enclosing it so that it could float. Tucked away beside all these is the M 3 half-track, so familiar to the readers of the Battlegames articles.

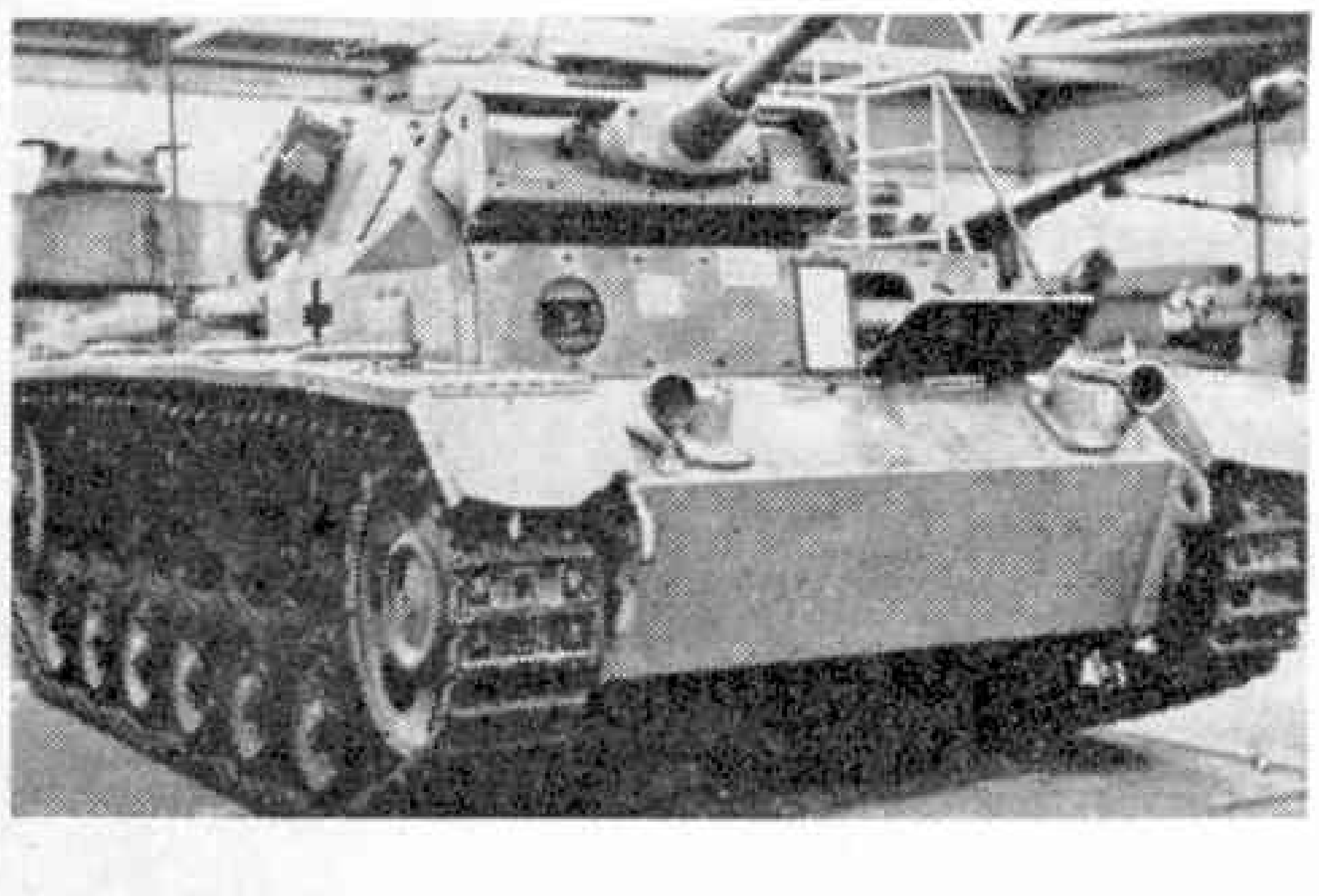
Vauxhall Motors built one of the most successful tanks used during the War, the 'Churchill'. The final Mark VII is on display. 'Churchills' were converted for almost every form of specialised use. Some were fitted with a flame projector in place of the hull machine gun. To accommodate the flame fuel, they towed a special armoured trailer—a sectioned flame projector and the trailer are at the Museum. This fearsome weapon was called 'Churchill Crocodile'. The main cruiser tank produced in Britain from 1942 was the 'Cromwell'. This underwent great changes during its production run—the vehicle at the Museum is a Mark IV armed with a 75 mm. gun. Based upon the design of the 'Cromwell' and closely resembling it is the 'Comet' that appeared in 1944. This had a shortened version of the 17-pounder which was extremely accurate. It saw very little action as the War was drawing to a close when it entered service.

Opposite these notable vehicles we find a tank worthy of mention, even though it was never used for other than training. It is the Australian 'Sentinal'. No heavy machinery industry existed in Australia before the War, yet she undertook and produced this vehicle by 1942. By this time, however, America had entered the War and was supplying large numbers of 'Grants' and 'Shermans', so there was no necessity for the home produced tank. The Museum exhibit is one that was successfully tested in England during the War. The 'Grant' is the last of the Allied tanks before the foreign tanks section. Of interest is the sponson mounted 75 mm. gun which was its main fault, yet heavy armour and good guns gave it an equal chance against the new German tanks in 1942.

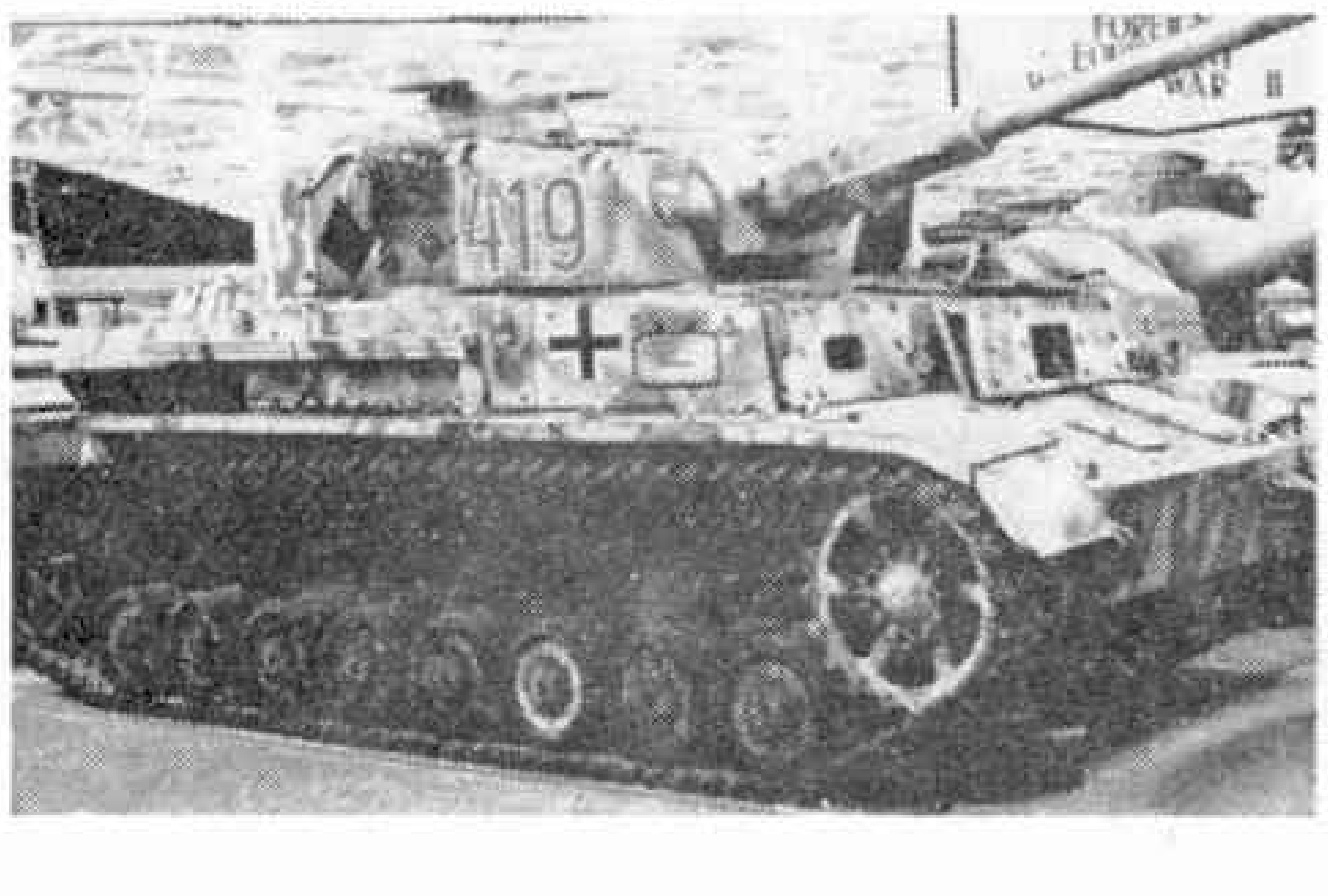
Thirteen German vehicles make up the bulk of the next group. They range from the tiny 3 ft. long 'Goliath' remote controlled demolition vehicle, to the largest and heaviest A.F.V. ever to see battle, the 'Jagdtiger'. This had a fixed turret and was armed with a massive 128 mm. (5 in.) anti-tank gun. The armour on the front of the turret was 10 in. thick (250 mm.). The chassis was that of the 'Royal Tiger', also on display. One of each of the six standard types of German tank is shown, the Pz K. I to VI (Tiger). The Steurmgeschutz III is one of the most important of all German A.F.V.s, as it was produced from the beginning to the end of the War, and the numbers produced far exceed any of the standard tanks. It has a 75 mm. gun mounted in a low fixed superstructure on the chassis of the Pz Kw III—the model on display was produced in 1944 and has a basic armour of 85 mm.

Strangely enough, one of the most popular exhibits is not a tank at all. It is the German N.S.U.-Kleines Kettenkrad. This is a small semi-track with the front wheel, suspension and handlebars of a motorcycle, so it can be called a half-track motorcycle. It was developed to overcome the extreme conditions experienced on the Russian front.

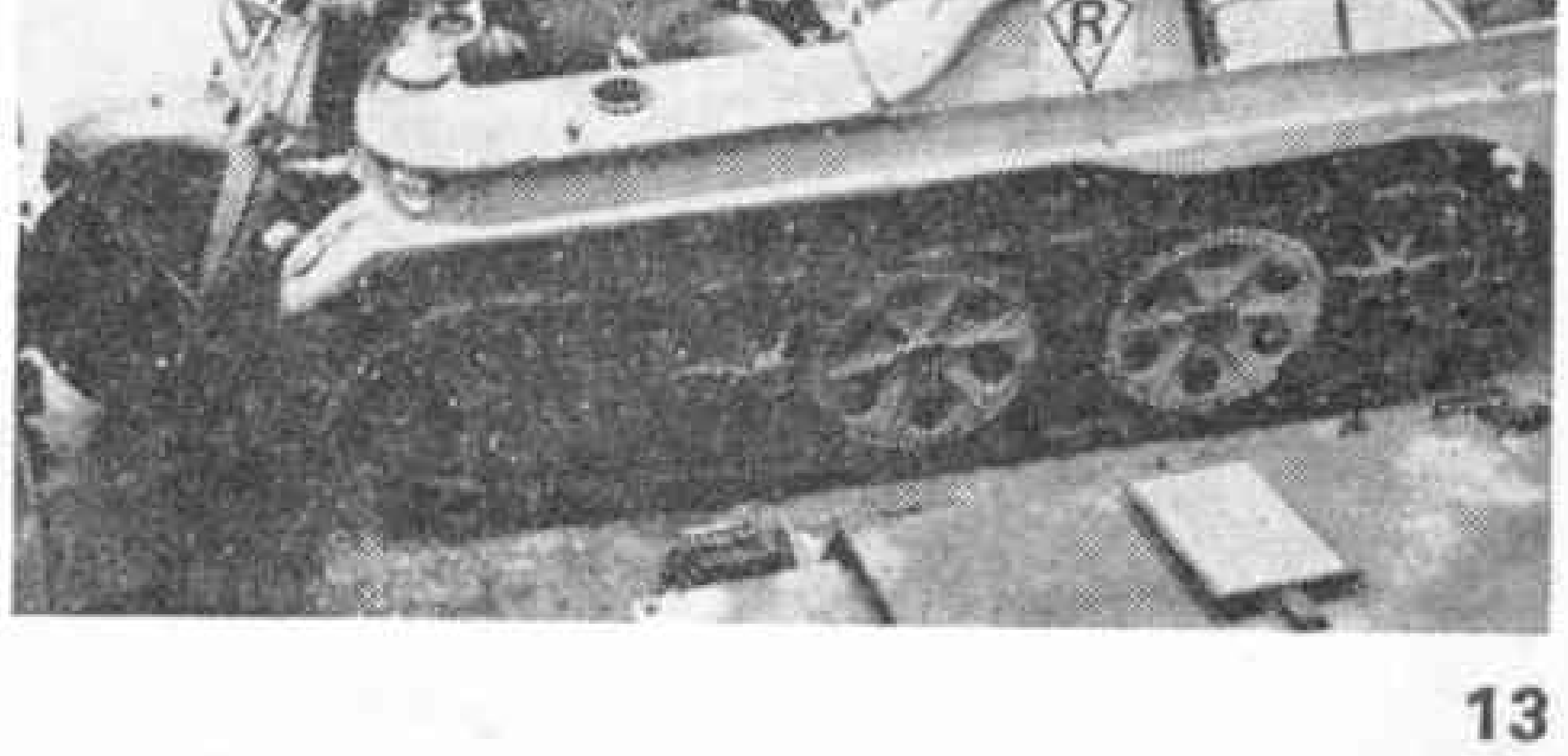
A Pz Kw III model L was armed with the long barrelled 50 mm. gun. This type appeared in the Desert in 1942



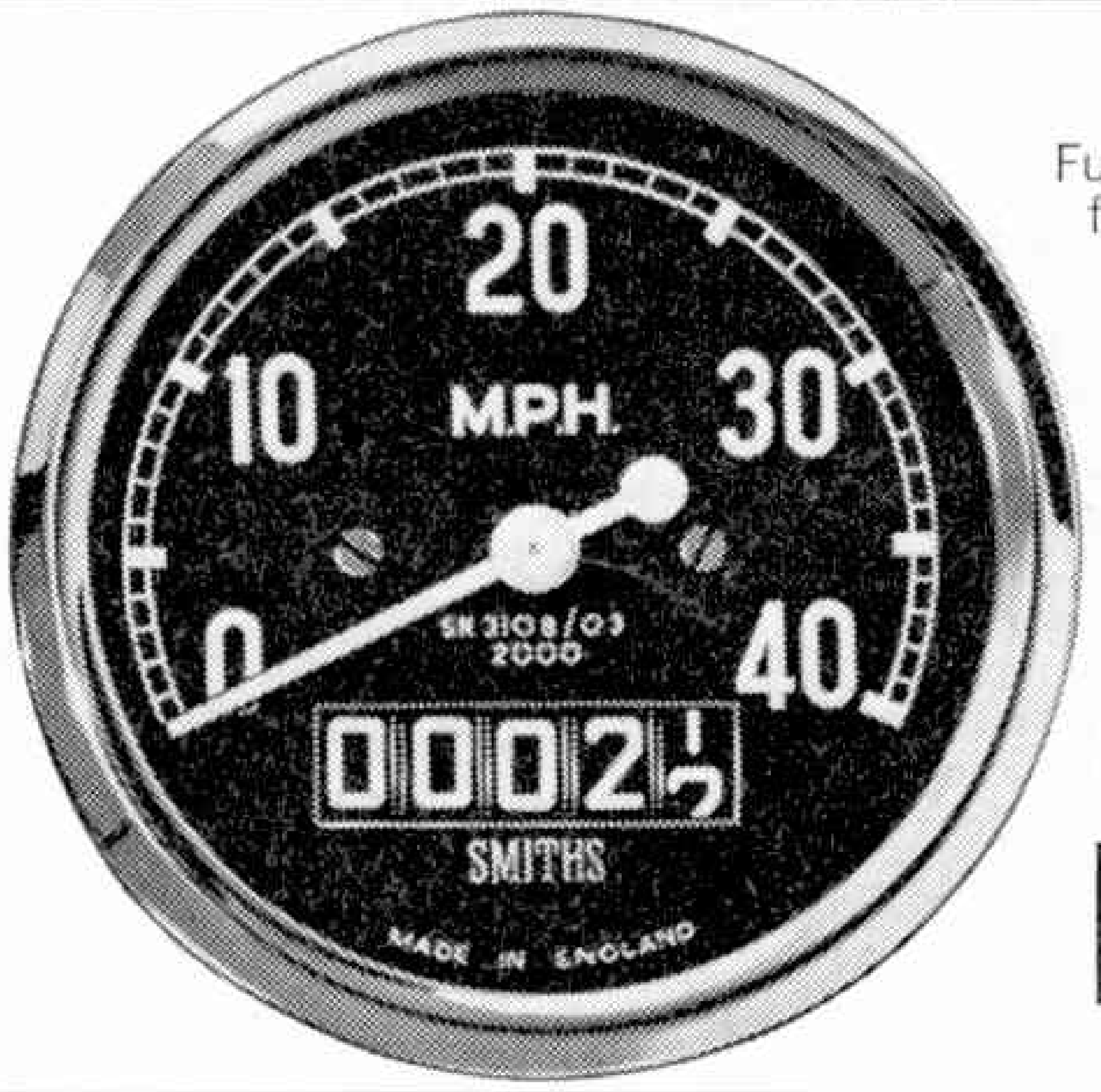
The Pz Kw IV was the main battle tank from the time it was fitted with the long 75 mm. gun in 1942 until the end of the war. Here we have an old model D improved by fitting a new gun and bolting on additional armour



The N.S.U. half-tracked motorcycle



IT'S THE NEXT BEST THING TO AN ENGINE!



Funny how a speedo makes riding a bike easier and more fun. It's great to know what speed you're doing, and you feel as though you're riding more than just an ordinary bicycle. A SMITHS cycle speedometer tells you your speed accurately up to 40 m.p.h., records the miles you travel too. SMITHS speedos don't cost a lot—you could soon save the 47/6 from your pocket money, or . . . what about a hint to Dad.

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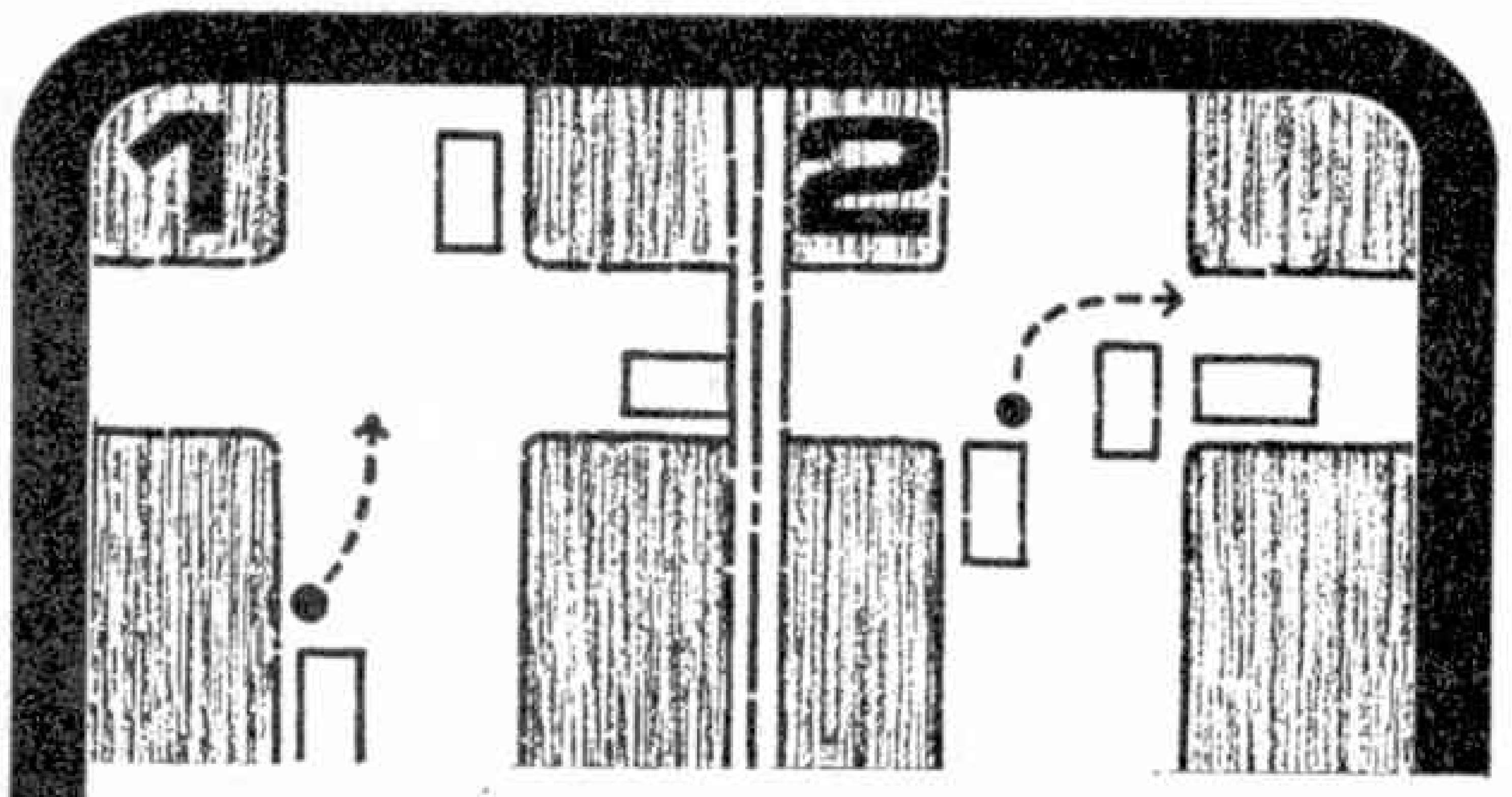

1 If you intend to turn right at a road junction, **prepare in advance!** When you are about 20 yards short of the turn, look behind you. If all is clear, signal your intention, and draw out to take up your position just to the left of the centre line.

2 Do not cut the corner. See that the road is clear to the right and left, wait until oncoming traffic has passed you, then take the corner in a wide arc. Gain the inside lane straight away, so as to let faster vehicles, which may be turning with you, overtake.

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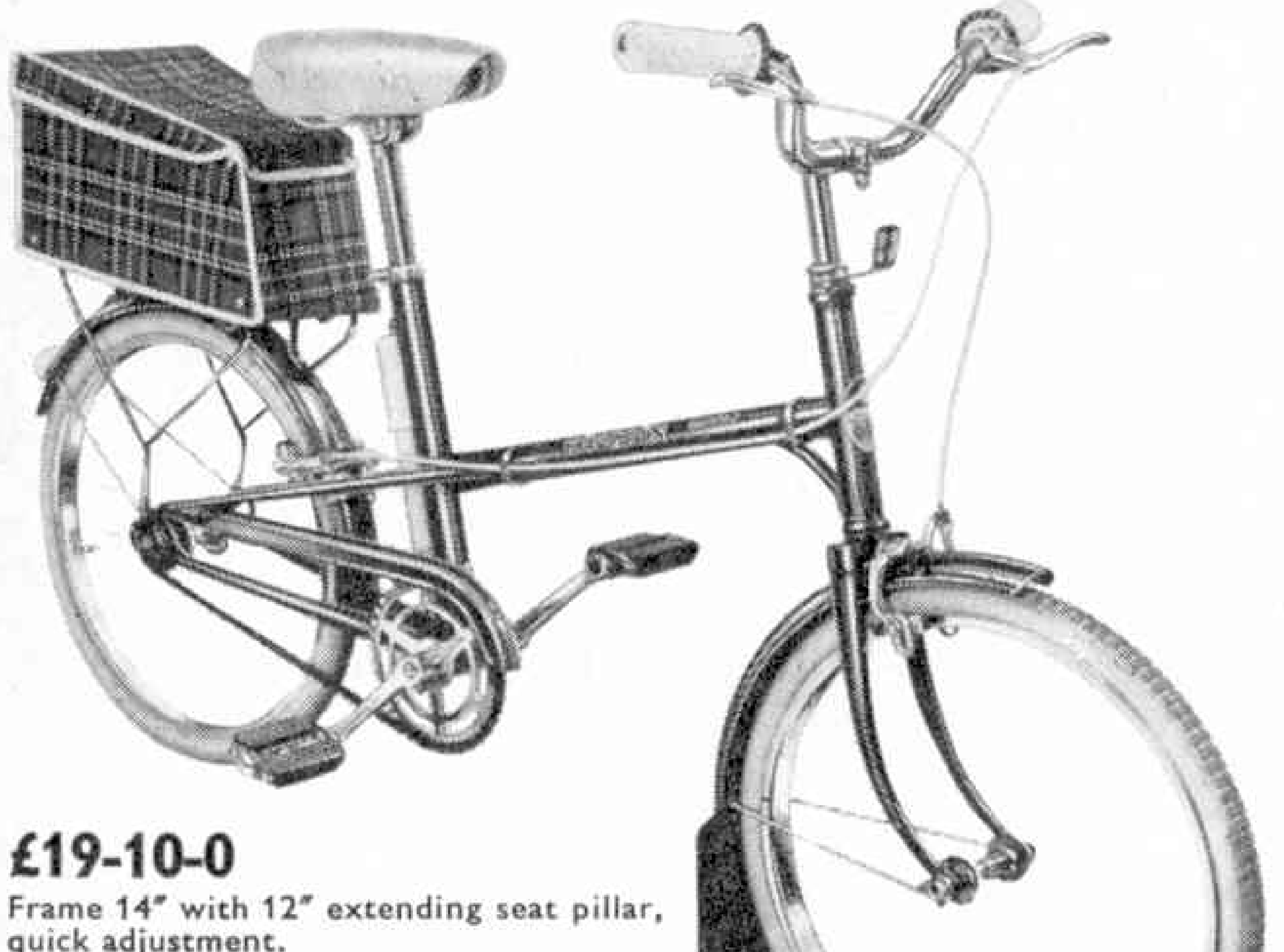

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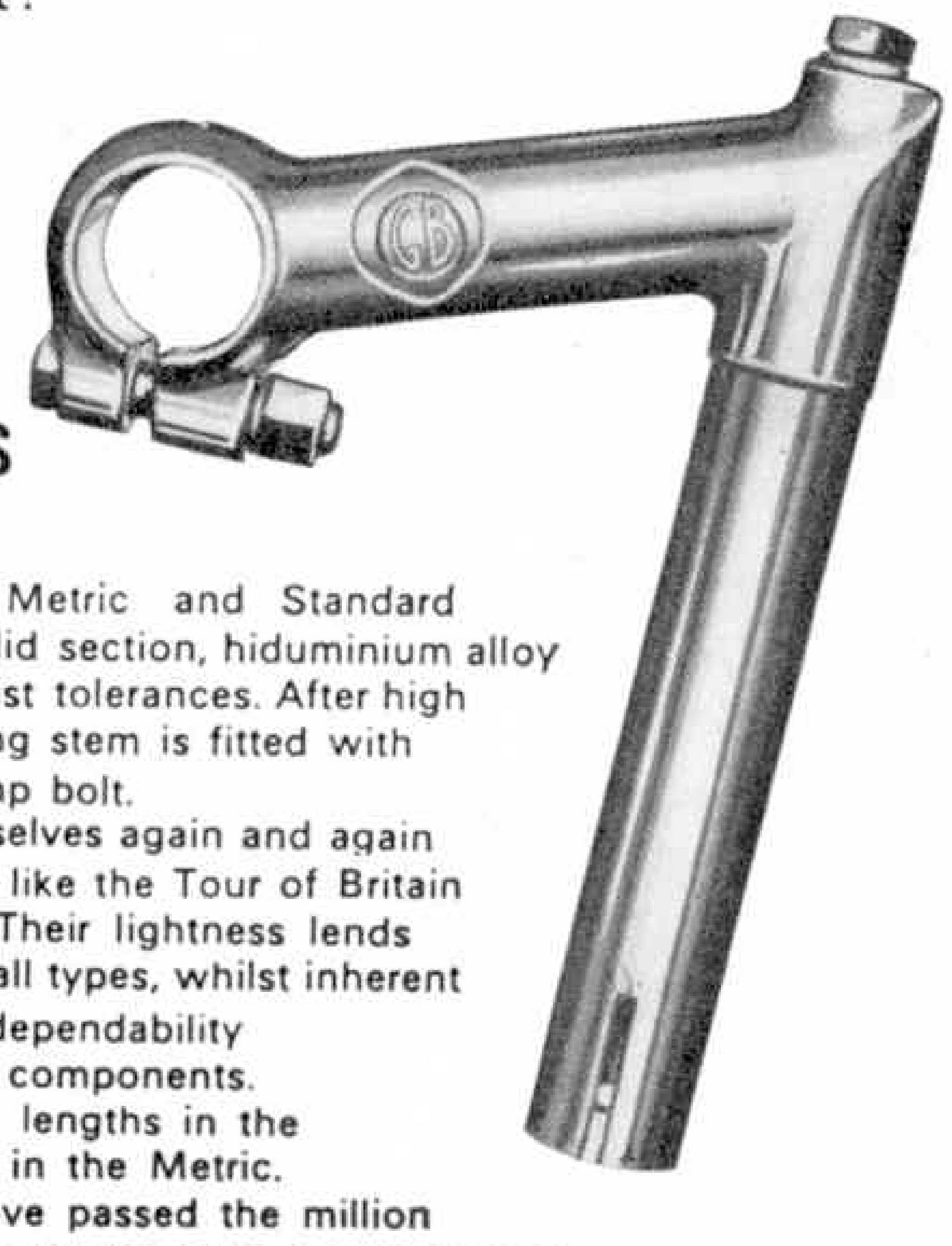

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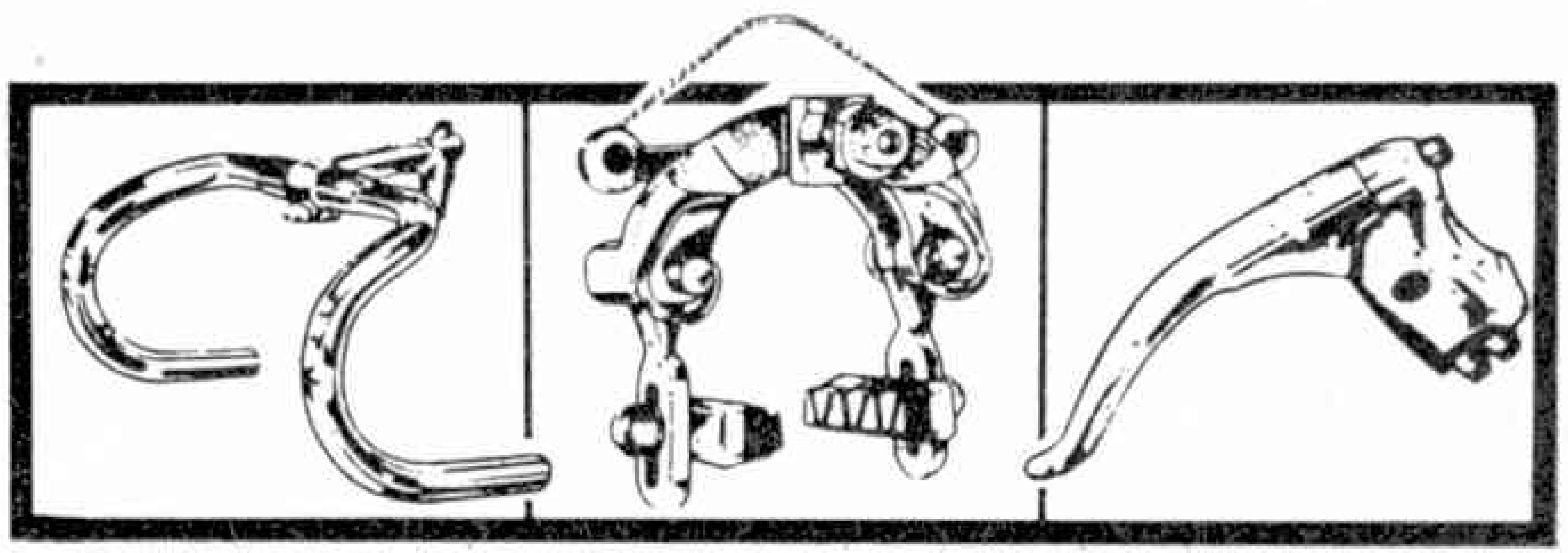

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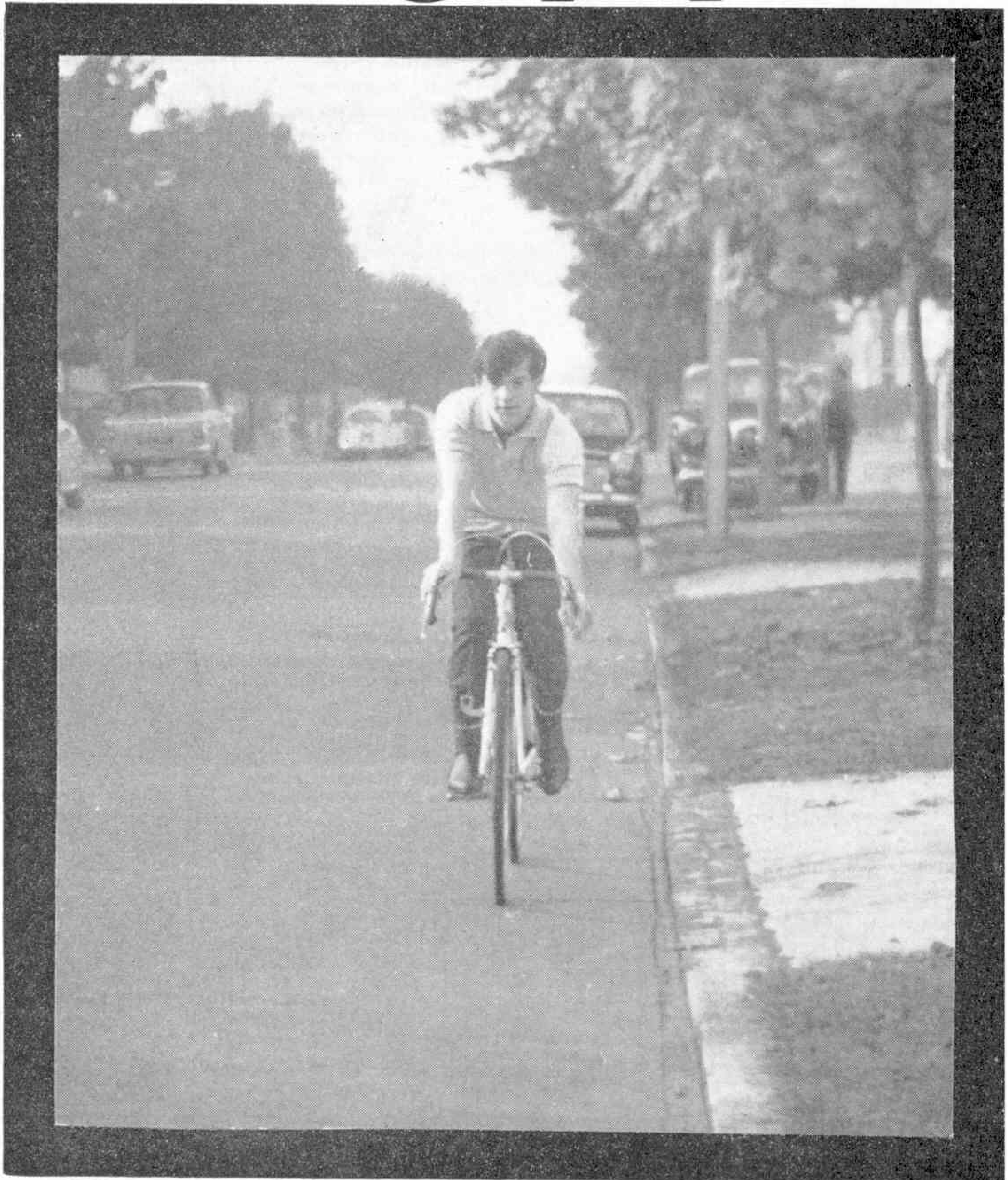


WHEN one is perched high on a bicycle saddle for the first time two thoughts are uppermost. What an awful long way down is the ground! And, how can one balance the two-wheeled contraption when one's body is raising the centre of gravity to such a ridiculous height?

Yet it is astonishing how few able-bodied people fail to ride a bicycle at the first attempt. Fortunately for us, the skill of balancing is taken over by that clever device behind the ears which keeps man perpendicular through his hours of consciousness.

It inspires the cyclist right from the start to steer the machine into the direction of fall and it does this to such perfection that almost anyone—child or adult—can ride a bicycle along a reasonably straight course during the first lesson.

But though we may cycle with the same nonchalance that attaches to our walking, there are skills to be acquired and knowledge of roadcraft to be learnt if we are to become safe riders, fully competent at all times, no matter what road conditions may prevail.

Skills and roadcraft. Let us deal with the skills first.

Just pushing the pedals round may propel a bicycle along a level road, but unless the rider's ankle action is right and unless his riding position is correct the first incline may have him puffing and blowing.

To achieve a proper riding position the bicycle must be adjusted to fit the rider—which I discussed fully in the last article. The balls of the feet—not the insteps—must be on the pedals, the hands comfortably on the grips and brake levers within finger-reach, and the body should be leaning slightly forward so that the weight is distributed over the front and rear wheels.

The advantage of this position is that more of the rider's weight can be delivered at the pedals without effort. But to lean too far forward —unless on a sports machine specially designed for such a stance —induces a 'bobbing' action and a bent-arm approach which can be uncomfortable and tiring. And it does nothing to help the rider move the machine more efficiently.

Now let us follow the action of pedalling through one revolution of the chainwheel. When starting away from the kerb the right-hand, or off-side, pedal should be in the 'two o'clock' position — alongside the down tube — with the toes of the right foot raised and the ankle down. At the moment of departure this pedal is pushed down and the hands pull slightly on the grips. (Too hard a pull may cause the cycle to rear.)

As the pedal descends, so do the toes until they are lower than the ankle. As the pedal passes its lowest point the toes stretch down and try to pull it backwards, and when it reaches the 'ten o'clock' position the toes are quickly raised and the ankle drops so that the foot is ready to push again. This is how the cycle began—if you will forgive the pun. The action is known as 'ankling'.

By adopting this method it is possible for each foot to impart power to the pedals for about 240 degrees, or two-thirds, of the circle.

As with many skills, ankling needs perfecting before its benefits can be enjoyed, but once the cyclist has mastered it he will find immediate advantages in hill climbing. Ankles will feel tired for the first few tries, but this will soon wear off.

Many miles of cycling take place alongside the kerb—preferably about eighteen inches away where a broken bottle smashed by a late-night vandal can be easily avoided, yet not far enough out to cause obstruction to overtaking traffic.

Much of the effort in maintaining this station can be minimized if a little known principle is put into effect. It is this: 'Don't watch the front wheel. Watch the road about six to ten feet ahead of it'.

The precise 'watching distance' varies with individuals, but it can be quickly found by experiment. If you know a quiet cul-de-sac or service road practise some straight-line riding on that principle. You will be astonished how easy it is.

In a private or secondary road one can use the join of tarmac or concrete sections for the straight line but—please—do not use the centre white line of a normal road for practice.

Having got our cycle going merrily there will come a time when we must stop it, which we do by simply applying the brakes. But did you know that, individually worked, the brakes of a bicycle behave quite differently?

The front one is powerful and, when applied hard, as fierce as a bucking horse; the rear is relatively weak but prone to lock the wheel on a greasy surface. If you would like a demonstration of the different power of the brakes try this.

In a cul-de-sac or service road select a kerb join and imagine a 'stop line' at right angles to it. Cycle up to a halt at the imaginary stop line, using both brakes, and make a mental note of the spot where you began to apply them. Place an easily-seen object, such as a yellow pencil, on the kerb at the spot where you first applied the brakes.

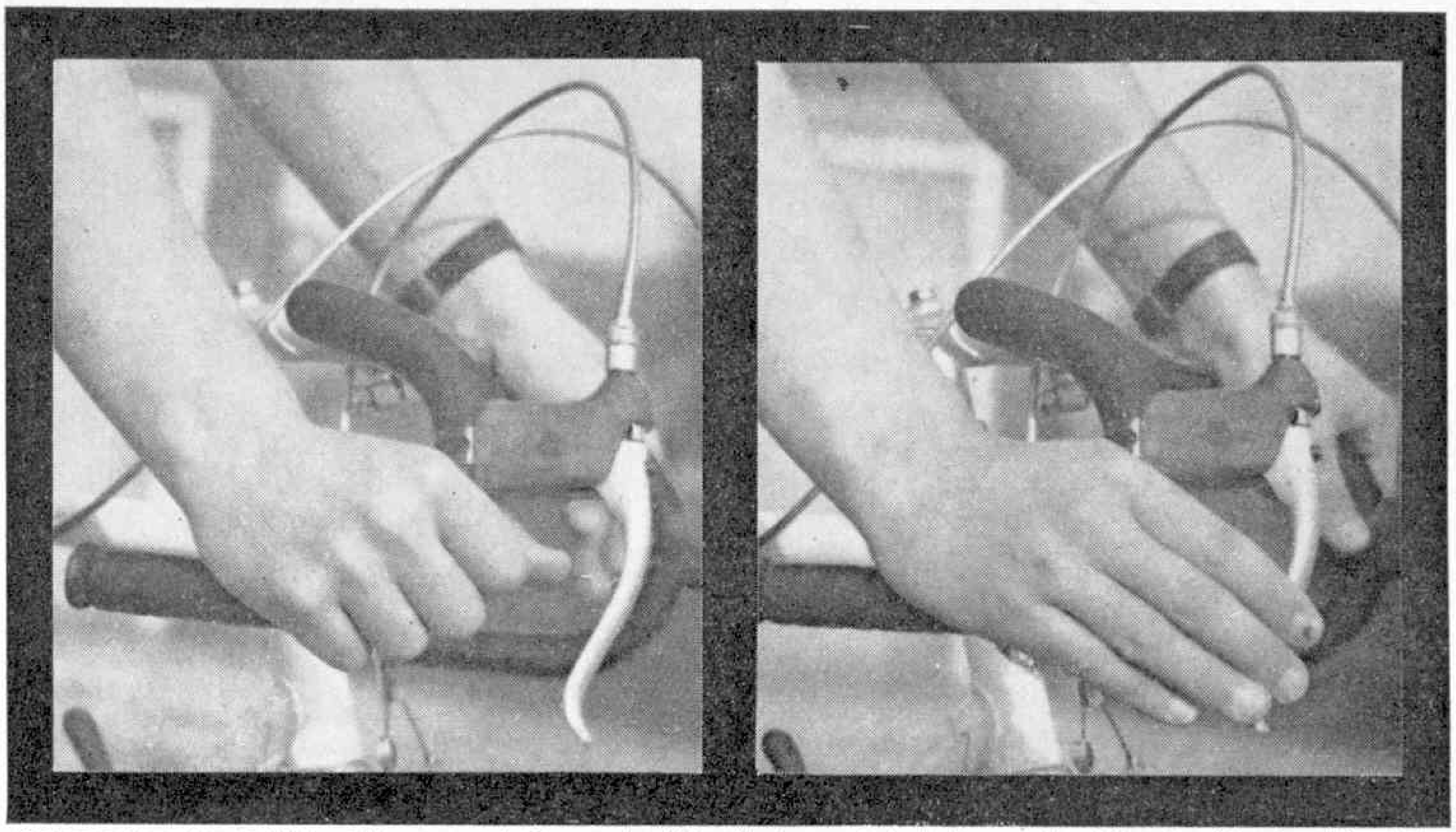
Now make the run twice more, first time using only the front brake, and the second only the back. On both runs apply the brake at the pencil. The back brake is unlikely to prevent you over-running the 'stop line'.

Be certain when you make these tests that there is no moving vehicle —or vehicle likely to start moving —behind you. Better still, try them with a friend and act as lookout for each other. Don't try them, or any other tests on a wet road; and do not be too fierce with the front brake. It may toss you!

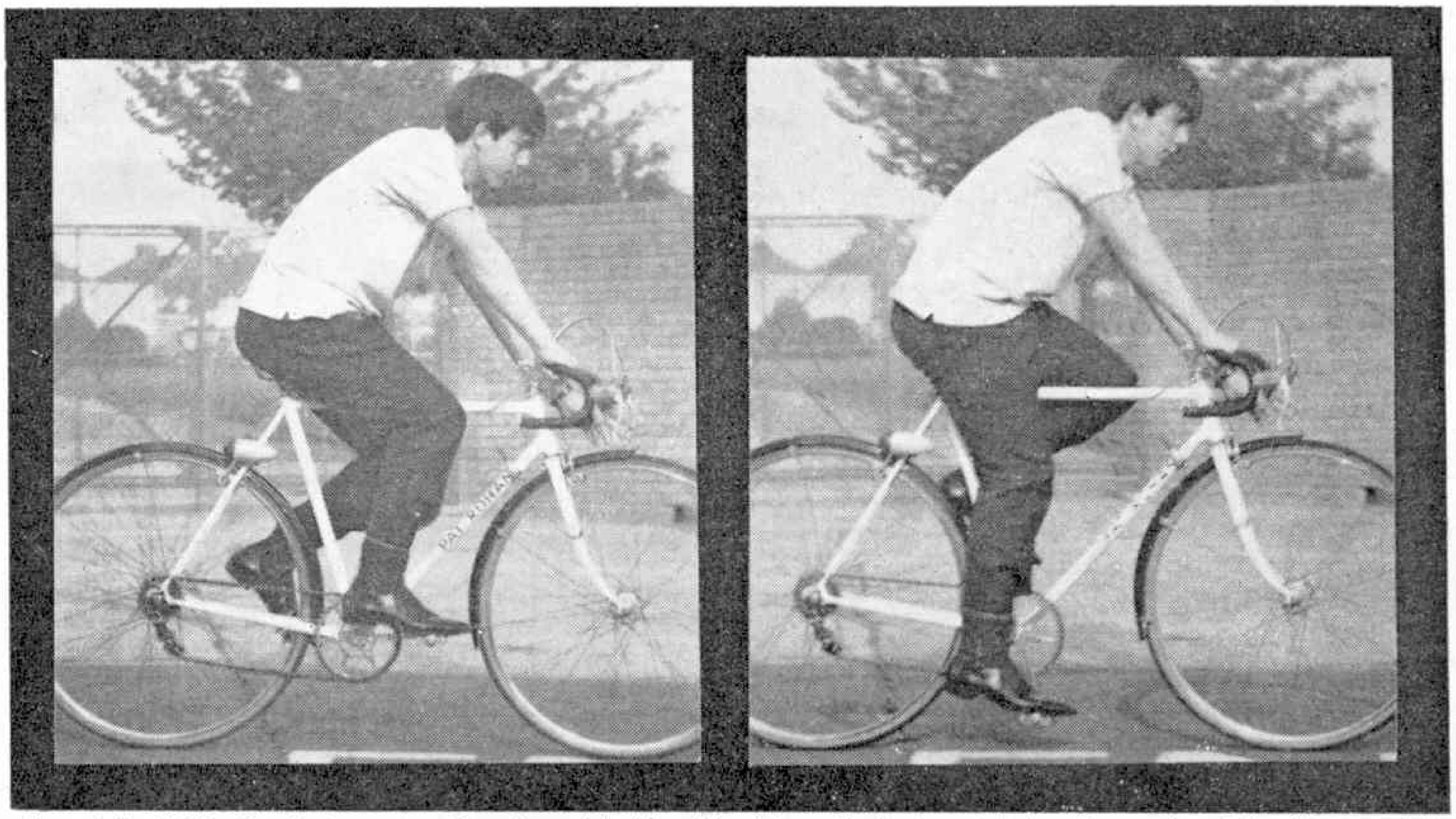
Cyclists often waste time at traffic hold-ups while they fumble to move the pedal into a starting position. In fact, there is no need to move the pedals after you have stopped—if you adopt the following technique.

When you are free-wheeling to a stop, back-pedal during the final two yards into the two o'clock or starting position. But do not put a foot to the ground—keep both on the pedals—until the machine is at rest. If you fail to do this, the starting pedal will 'run over' the two o'clock position.

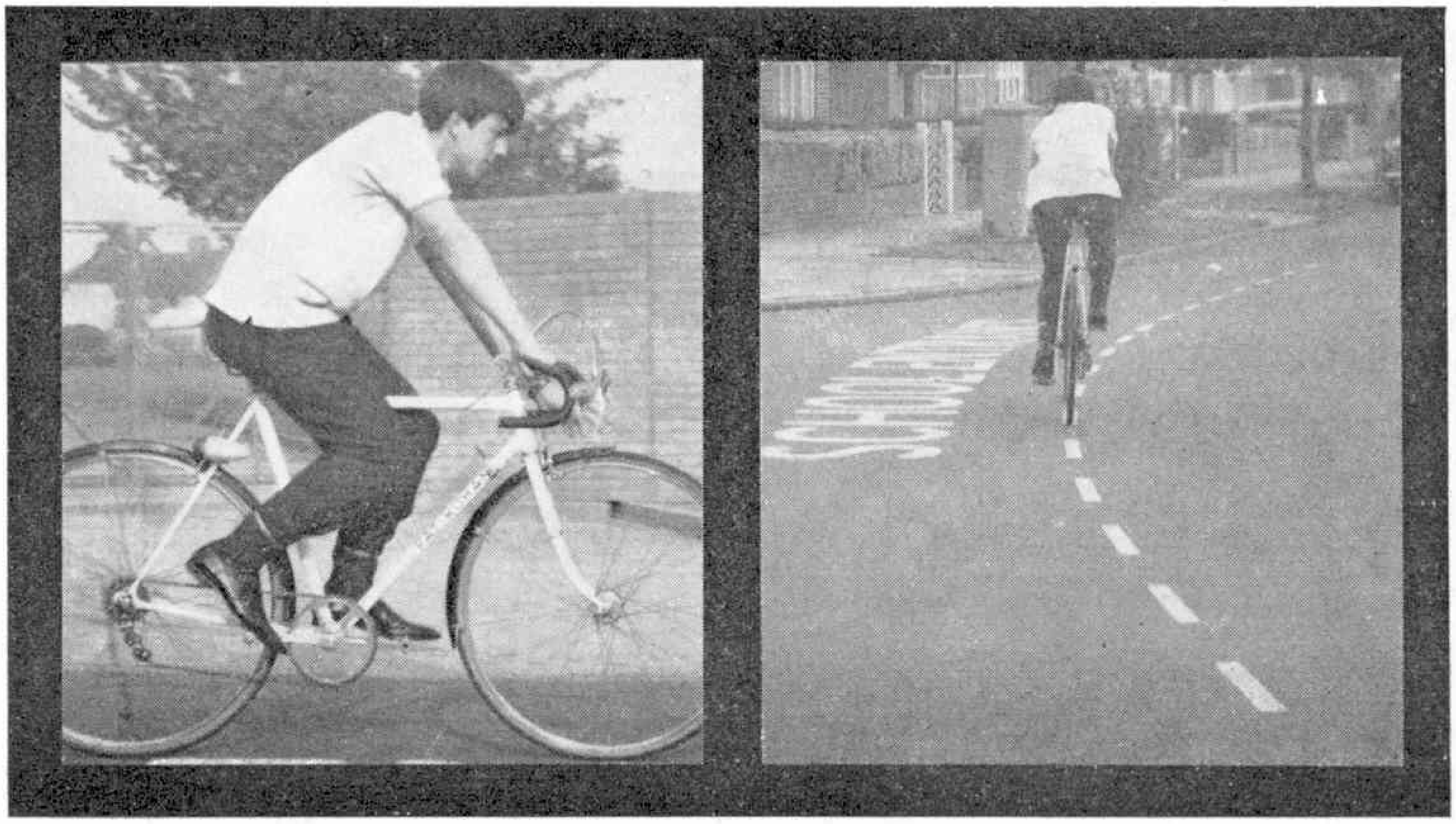
Leslie B. Howard



Brake positioned so that it is within easy reach. Fingers should be able to operate brake lever easily while palm of hand and thumb keep firm control of steering



Above left: right foot has just progressed from 'two o'clock' position (alongside the down tube) and is now in middle of power stroke. Right: start of 'ankling'. Toe of right foot drops at lowest point to pull pedal through 'bottom dead centre'. Below left: end of ankling. Toe of right foot will now rise with pedal while heel remains relatively stationary. Foot now 'idles' until it reaches two o'clock position. At this stage left foot is in full power stroke. Right: using white line near kerb of quiet road for cycling practice



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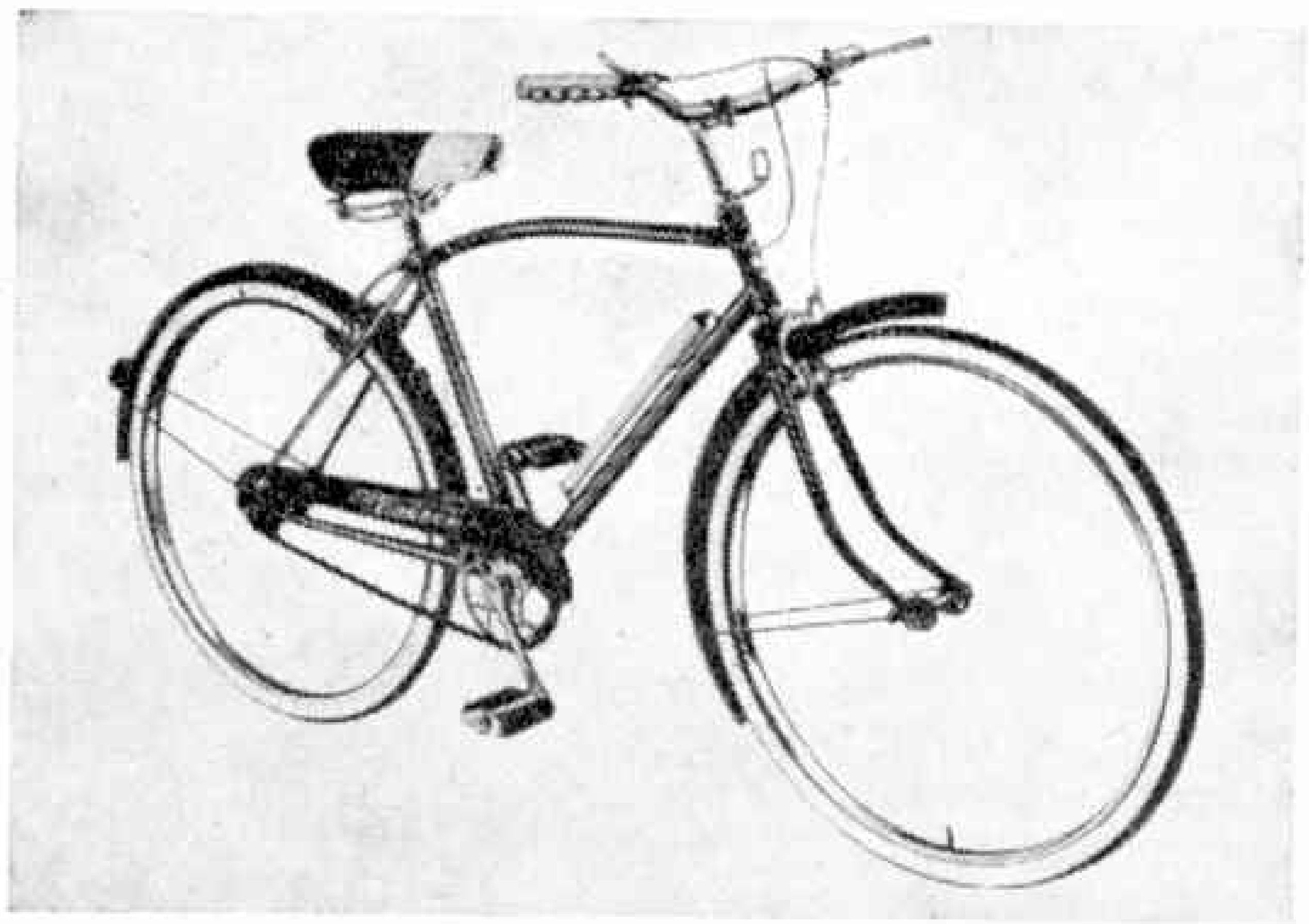

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End of The Road

IT'S the end of the road for the Harrods electrics. After 25 years of faithful service, the Knightsbridge store's dignified and distinctive electric delivery vans are to be pensioned off and replaced by diesels.

The passing of those high-riding, boxy little electrics in their sober green livery will sadden a great many Londoners to whom they have been a familiar and peculiarly indigenous part of the London scene. Even in 'with it' Chelsea and Hampstead they seemed much more at home than the 'Jags' and Aston Martins.

Phasing-out of the electrics is already well advanced. Of the one-time fleet of 60 only 17 are still in use and, soon, they too will be gone and the only place a nostalgic Londoner will find one will be the Science Museum.

What were they like? To look after? To drive?

According to Mr. E. J. Beveridge, Harrods' transport manager, their maintenance requirements were very modest. The electric motors, built to Harrods' own design over a quarter of a century ago, never needed more than the minimum routine servicing, and the Nife tubular positive nickel iron batteries that provided the power, though charged each night and flogged hard each day, required virtually no attention throughout the whole of their service life. As the life of the batteries averaged over ten years and many of them were still in use after 60,000 miles, it says a lot for the built-in ruggedness and durability of the Nife battery.

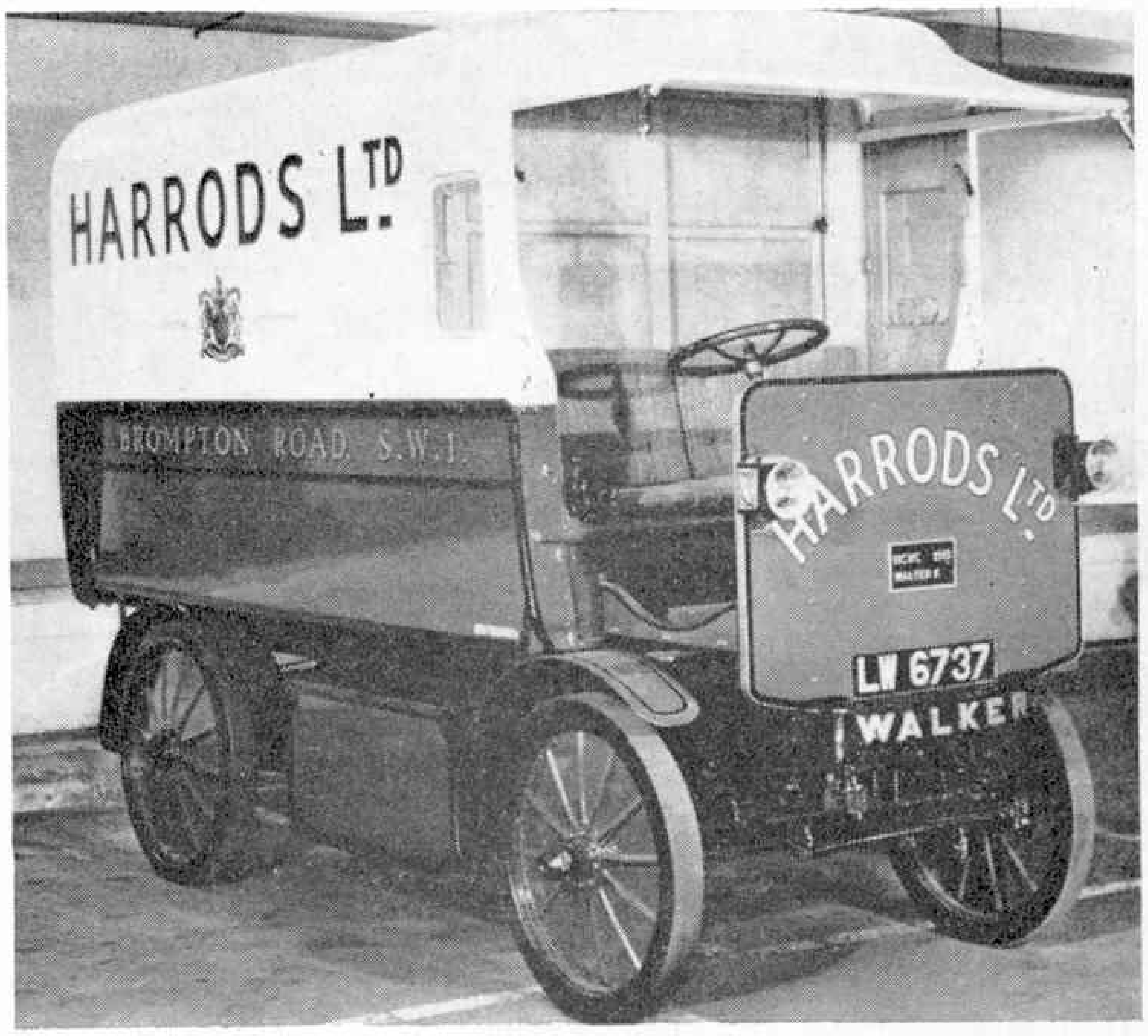
And to drive? They started without any trouble, whatever the weather; vision from the cab was excellent because the driver was perched high up and there was no bonnet to obscure the view: he had a plain steering wheel in his hands and only one instrument, the speedometer, to keep an eye on. The only other controls were the speed regulating lever and the two brake pedals.

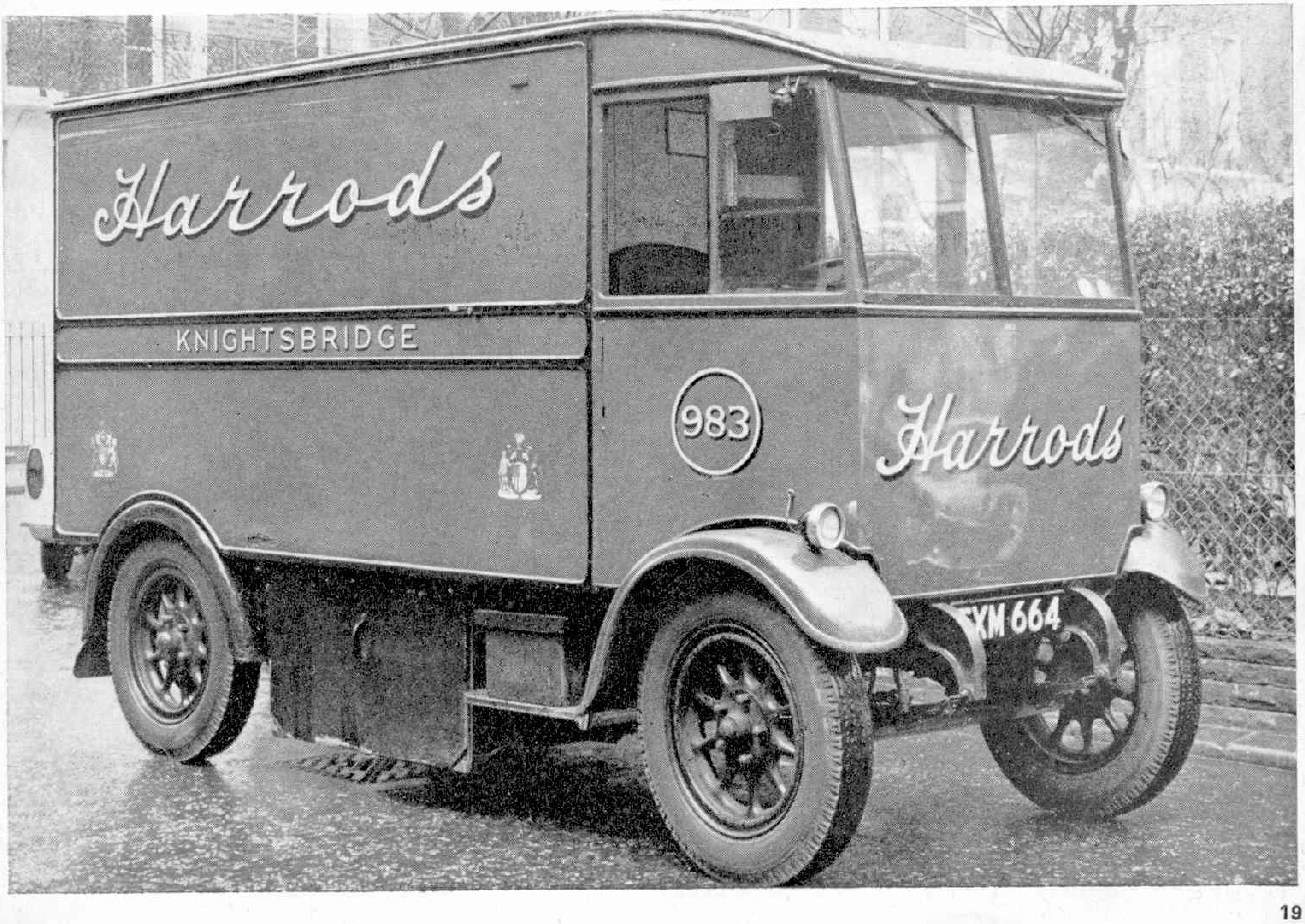
They weren't fast, of course. Fully laden with a ton of assorted merchandise the top speed was about 20 m.p.h., but for their prime function of delivery around town, where speed was less important than 'in-traffic' performance, they were ideal. Their range of about 60 miles on one battery was more than sufficient. They also had the two important advantages that are inherent in electric vehicles and that alone should have endeared them to Londoners: they were almost entirely noiseless and they didn't belch out exhaust fumes to add to the capital's air pollution.

They were specially designed and built for the job, in the workshops beneath the store, under the guidance of the late W. Howes, M.I.E.E., M.I.Mech.E. This was in the early thirties when Harrods were looking for a replacement for their existing fleet of Walker electrics—American-built vans that had served the company well for 20 years.

The prototype for the new van that appeared in 1938 filled the bill admirably and Harrods gave its engineering department the go-ahead to build a complete fleet. And, in 1941, there they were, 60 uncompromisingly utilitarian, but surprisingly elegant hand-built delivery vans that were destined not only to give outstandingly reliable service, but also to become an affectionately-regarded feature of London's streets.

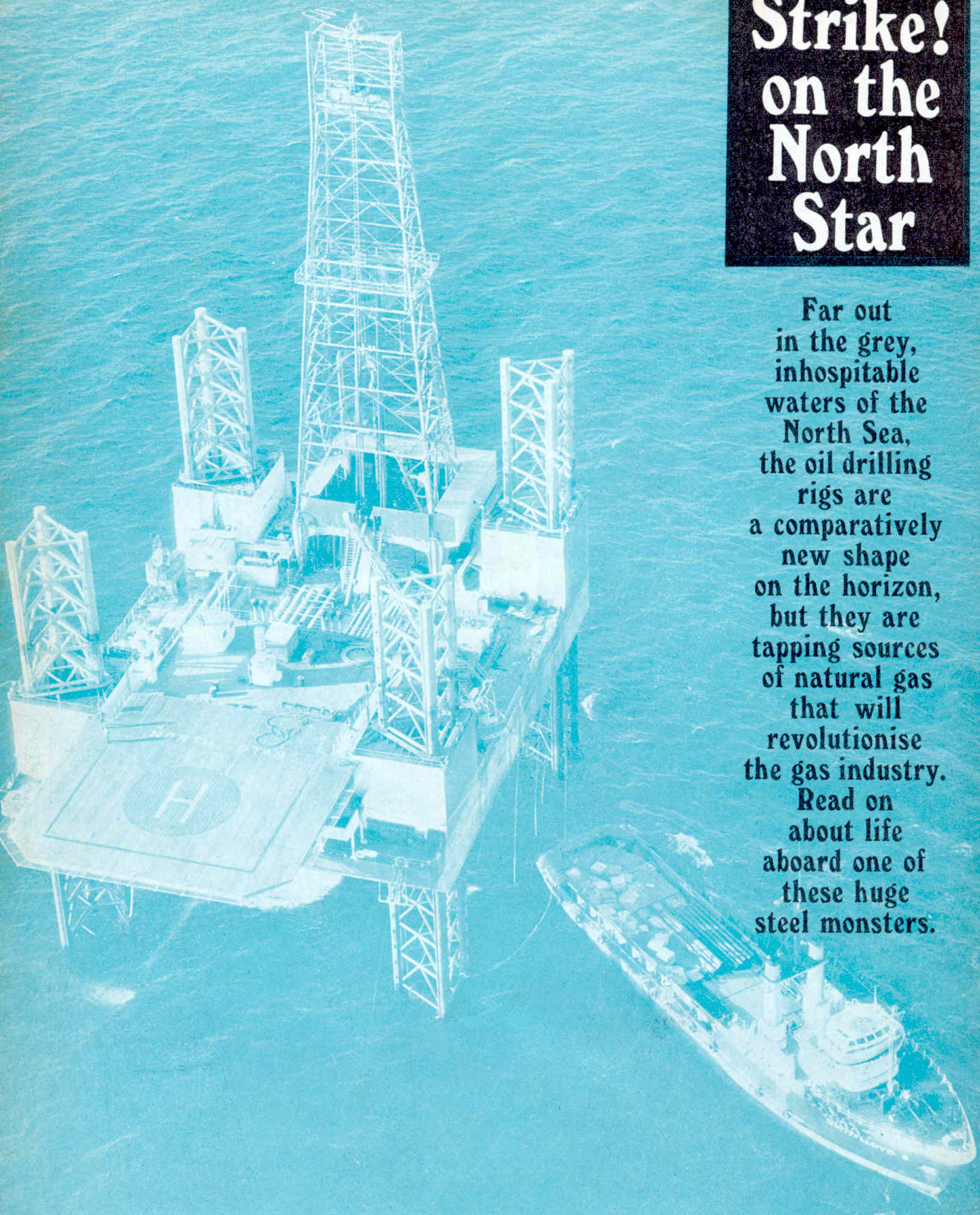
And now they have come to the end of the road. Progress and the pressure of changing needs and conditions has overtaken them. But, who knows, with all the research that is currently being devoted to electric propulsion, we may one day see yet another generation of Harrods electrics.





Strike! on the North Star

Far out in the grey, inhospitable waters of the North Sea, the oil drilling rigs are a comparatively new shape on the horizon, but they are tapping sources of natural gas that will revolutionise the gas industry. Read on about life aboard one of these huge steel monsters.



THIS is the story of a drilling rig, just one unit in a world wide search for gas or oil, that last year, alone, cost the huge sum of £2,200,000,000.

Probably the greatest gamble is the hunt for natural gas on the Continental shelf, under the North Sea, somewhere under the lonely, sometimes wild, tract of sea between Great Britain and Europe.

The story begins in the yard of John Brown (Clydebank) where the huge drilling platform, costing nearly £2 million, was completed, late in the summer of 1965. It would straddle both fountains of Trafalgar Square and clear the top of Nelson's column by 100 feet.

With the giant legs raised, the great metal platform floated gently on the River Clyde and was taken in tow by the 1,100 ton tug, 'Pacific' —the second largest tug in the world—to make its long trip southwards, down the Irish Sea, around Lands End and through the English Channel, to its destination—block 49/6—80 miles east of the River Humber.

Oil drilling has a language of its own. As soon as it was in place, the job of 'spudding in' started; the legs had to be lowered to the sea bottom and the rig made fast, firm and secure against the wind and waves.

The months that followed proved how good a job the crew had made.

Never in living memory had such autumn and winter storms raged. Winds of over 90 m.p.h. roared over the platform; waves, 40 to 50 ft. high battered at the huge steel structure, but all through it the build up of supplies and equipment went on. Drill bits, collars and up to 15,000 ft. of drill tube came aboard from the supply boat. A drill bit, the triple wheeled, diamond tipped cutter that bores through stratas of shale and rock, has only a 24 hour working life before it has to be changed, so many of them are needed. In addition there is the fuel oil, stores of food and other service requirements to be loaded aboard.

On the platform there is accommodation for 72 men, consisting of the platform 'boss man', the 'Toolpusher' (or just the 'Pusher') as he is generally known. In addition there are the drillers, derrickmen, rotary helpers, roustabouts and maintenance men, about 35 in all. The other accommodation is for the various service crew, operating personnel, radio operators, geologists, as well as administrative staff.

They do a 14 day tour of duty on board, working a 12 hour duty shift.

For two weeks they live and work together as a team on a rectangle, some 170 ft. long by 130 ft. wide, balanced on four retractable legs, each 267 feet long and capable of being raised at 1 ft. per minute.

Senior staff have two-man staterooms with communicating shower and toilet facilities. The other staff are housed in four-man staterooms. There are recreation rooms for most types of indoor games which can be used for film shows.

Drilling makes men hungry. To serve them, they have a fully equipped, electrically operated galley, with large refrigerator capacity. The meals are varied and substantial. Steaks, roast beef, chicken and turkey, all these are on the menus—there is no shortage of good, well cooked food.

Power for technical and domestic operations is supplied by a diesel electric generator and the highest standard of safety precaution is observed. Fully equipped fire stations are placed at all strategic points around the rig, with a fire hose system linking throughout.

The work is hard and can be dangerous—a two bed, well equipped hospital is provided—just in case!

Contact with the outside world is by radio with the shore base—manned 24 hours a day—and by the two supply ships, or any other vessel, should the need arise. In addition, there is an 80 ft. square, helicopter platform built into the main area.

On May 12, 1966, after a 24 hour security 'blanket' of thick sea fog, came news of the first 'strike'!

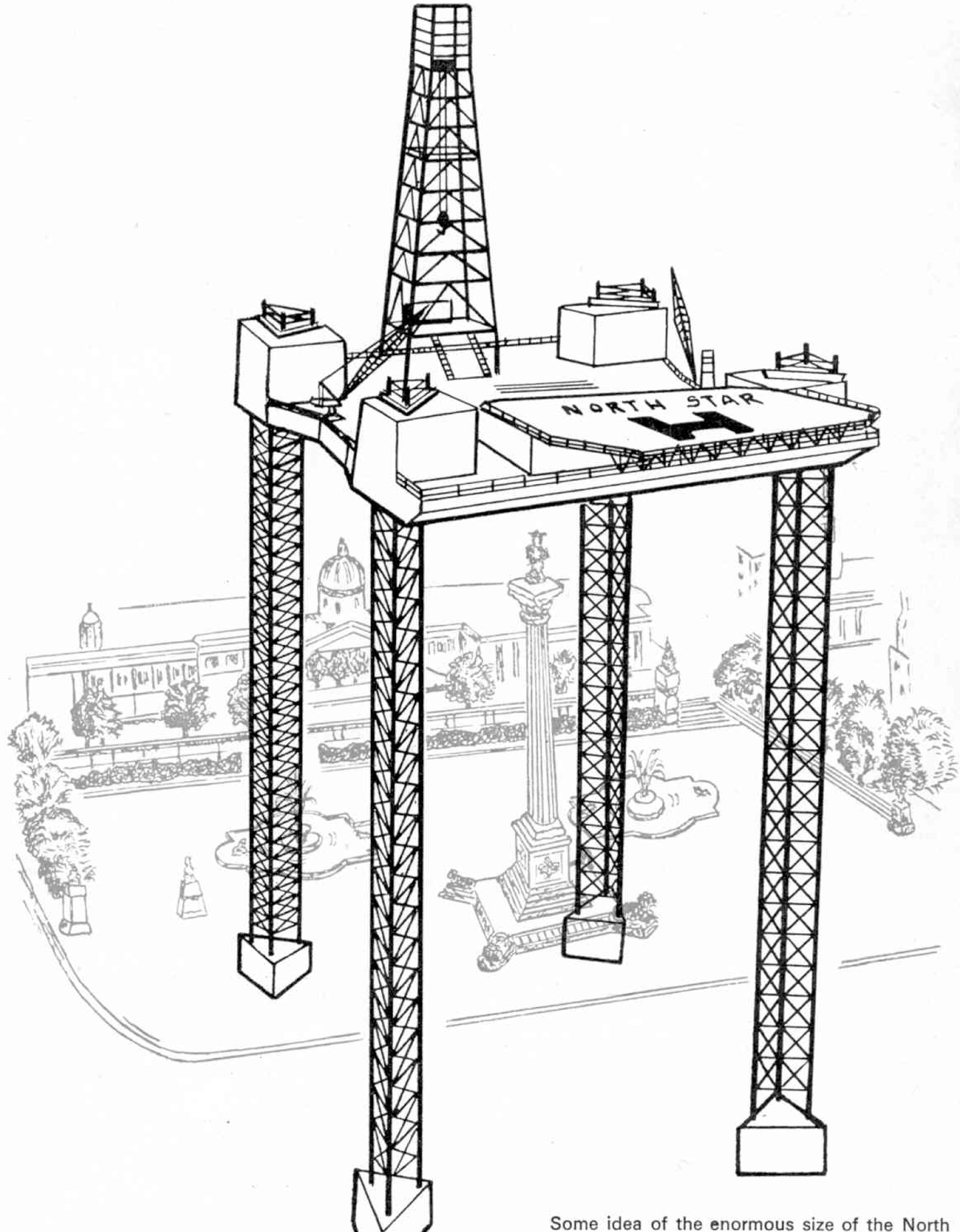
Some condensate was found, the light gas oil which is the basic material of liquefied petroleum gas and petrochemical manufacture, but the real find was gas—gas that has since flowed up at the rate of 17 million cubic feet a day—a new source of natural gas that will revolutionise the gas industry.

A pipe line to this supply is already in the advanced planning stage; soon the gas will be coming ashore and the whole economy of the industry will change, radically.

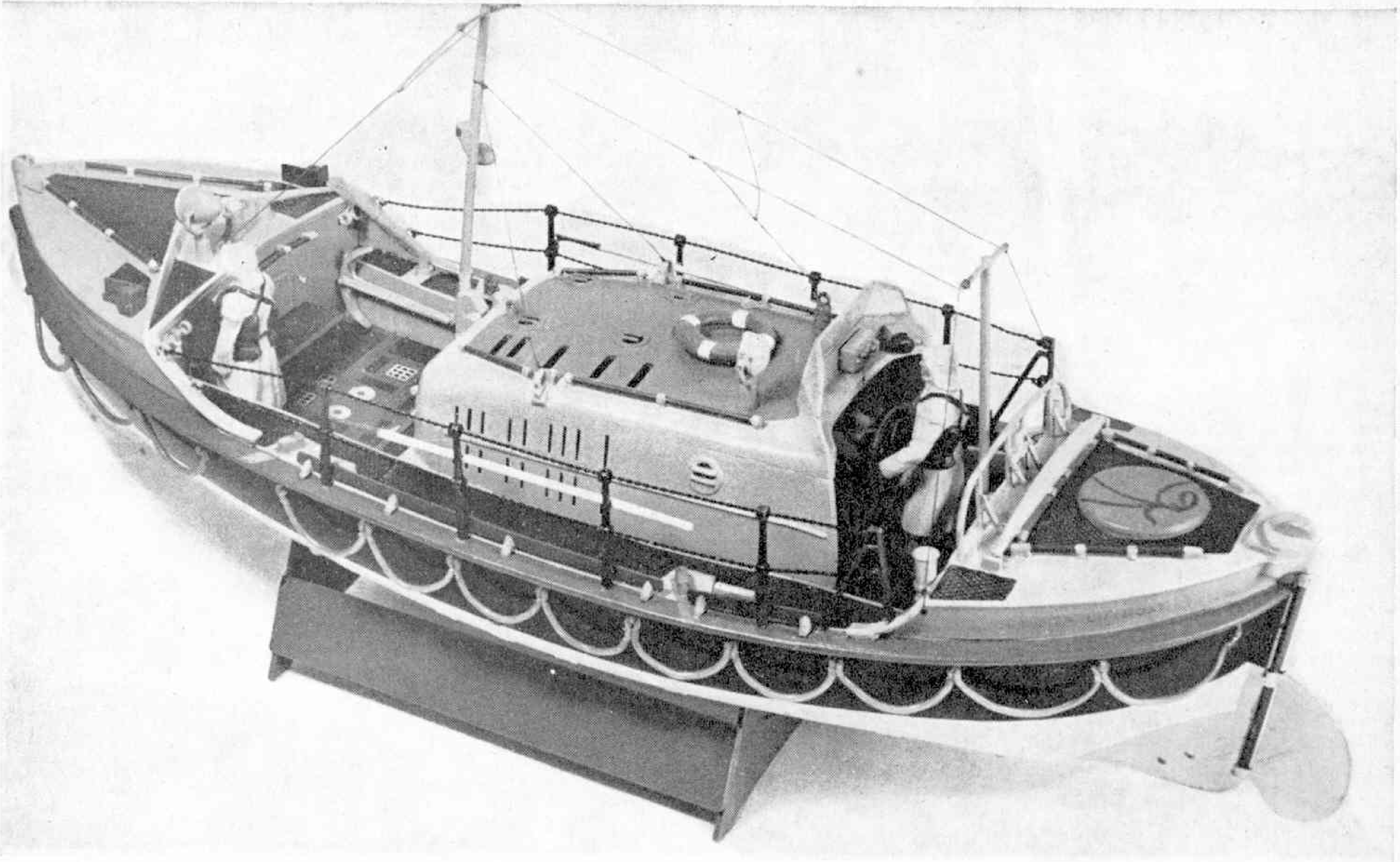
Meanwhile, 'North Star' has moved on, to a new site, in block 48/30—about 40 miles south of the original find. Already the job of 'spudding in' is going ahead. The 'Pusher' will be feeding his slender drill pipe down through the strata under the sea bed in search of more gas. Twenty-four hours a day the work will go on, biting deeper into the earth's crust. Changing the drill every day is known as the 'round trip'—pulling the drill bit out, changing the head and lowering it to its operating position again.

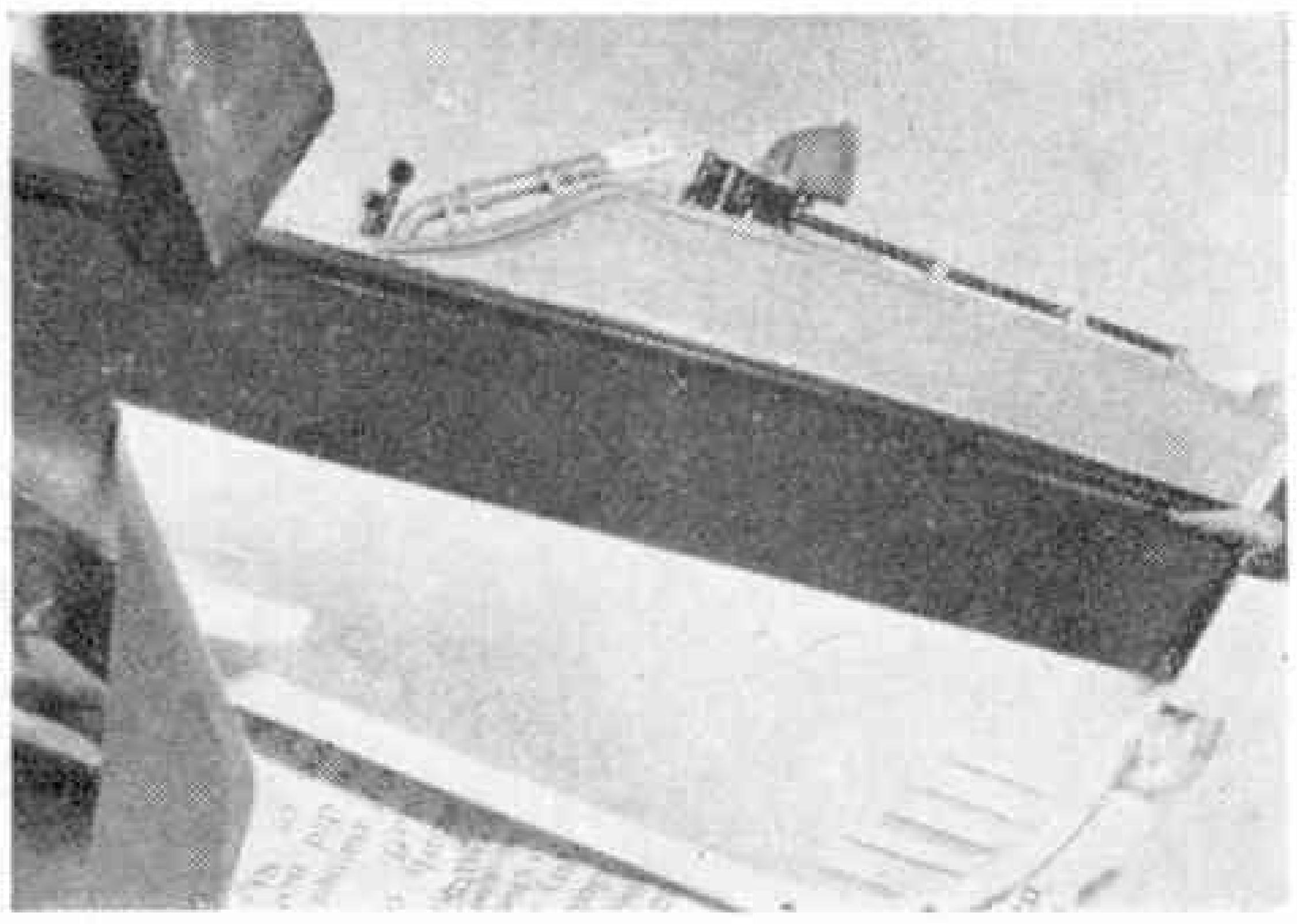
It is a hard life, an exciting and exacting one, but it is a man's world and the stakes are very high!

H. J. Summers



Some idea of the enormous size of the North Star rig is given here, where it is drawn to the same scale as Trafalgar Square with Nelson's Column dwarfed beneath the legs of the rig.





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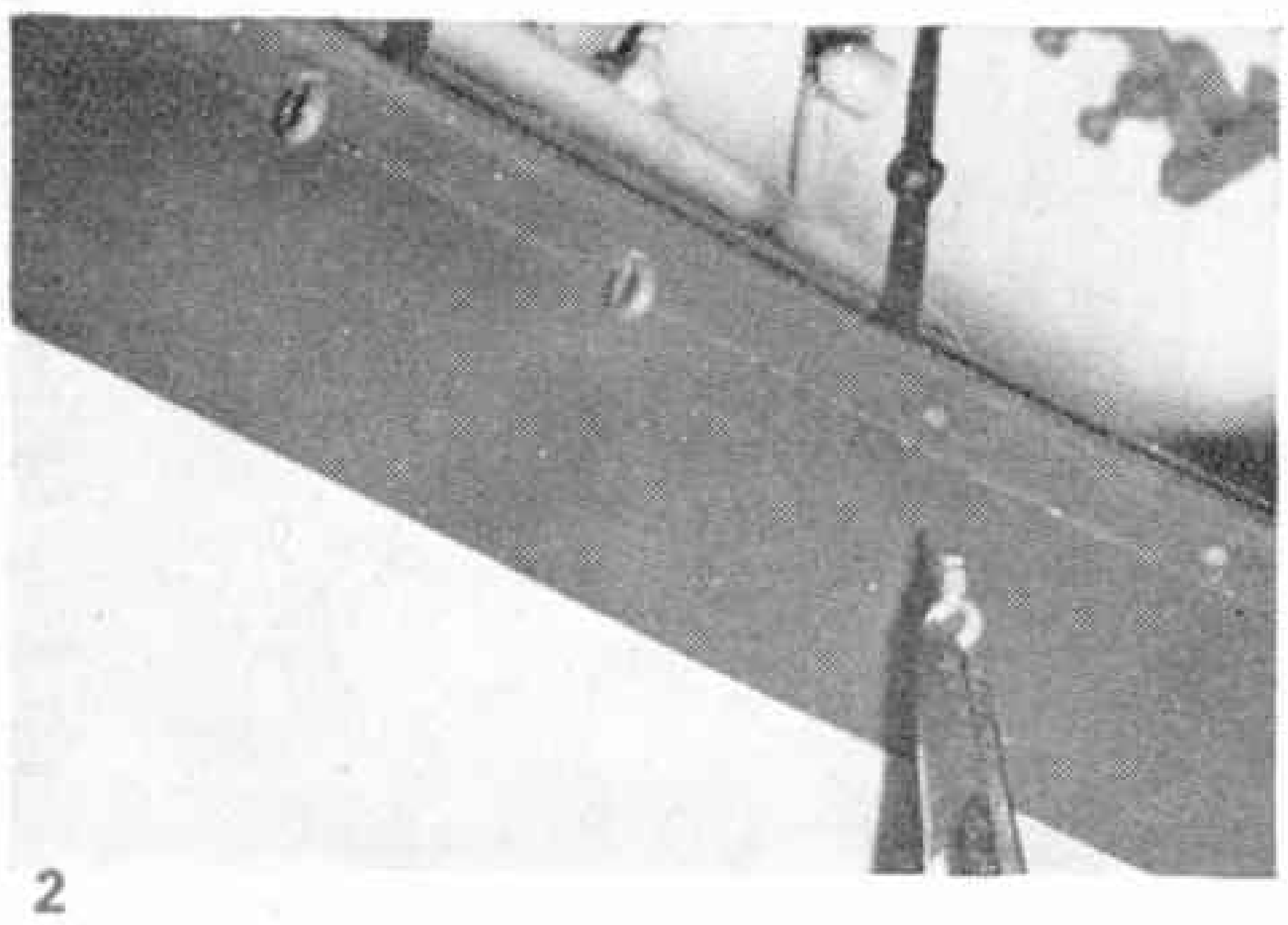

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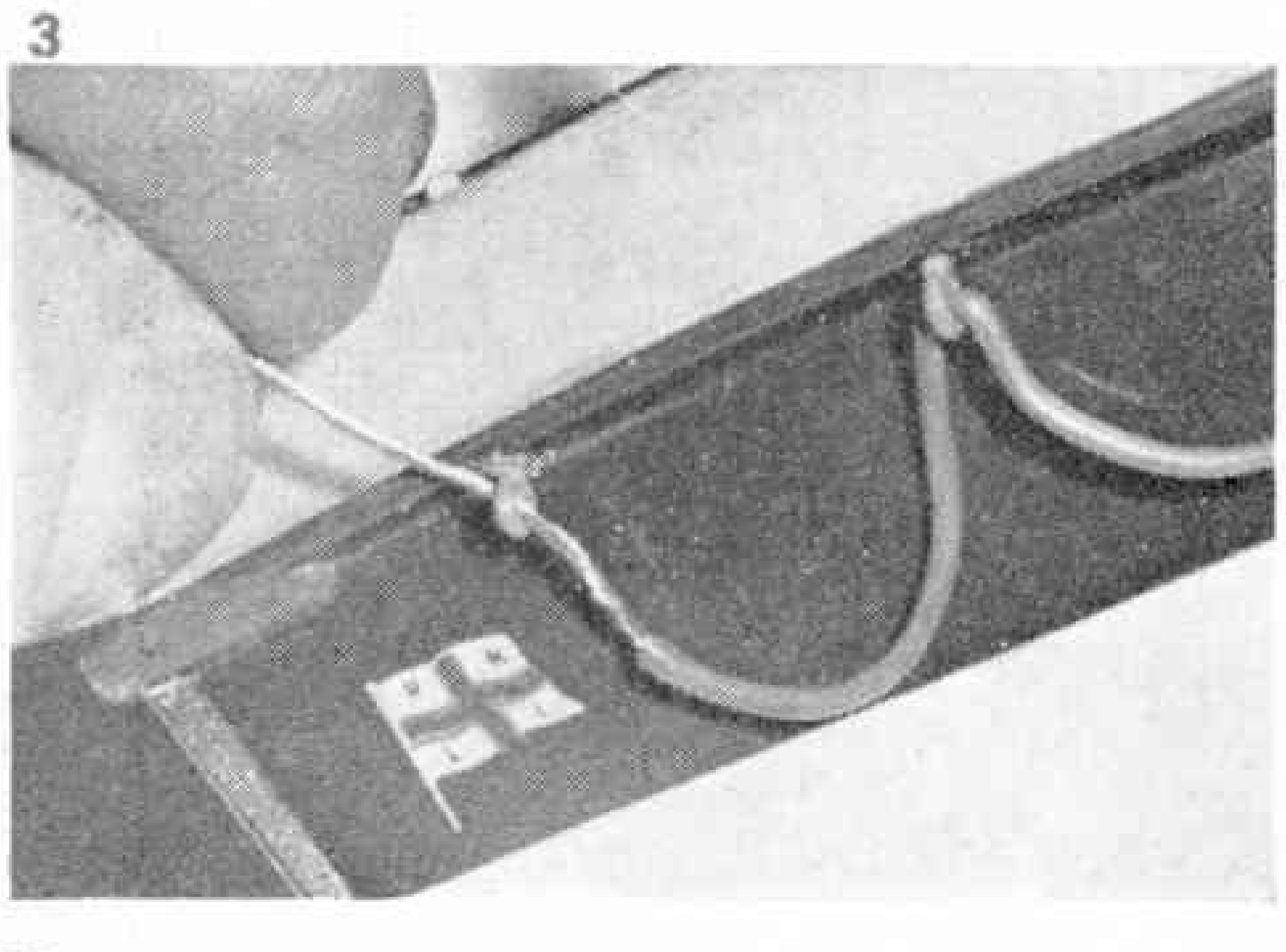


3

The Frog Caister Lifeboat

Doug McHard gives you some building hints for the boat shown on our cover painting.

Here's an off-beat plastic kit for those of you who want to get out of the well-worn rut. It's one that handsomely repays careful paintwork and it offers numerous possibilities to the innovator. The Frog Caister Lifeboat kit costs 10s. 10d. and measures over 9 in. from stem to stern.

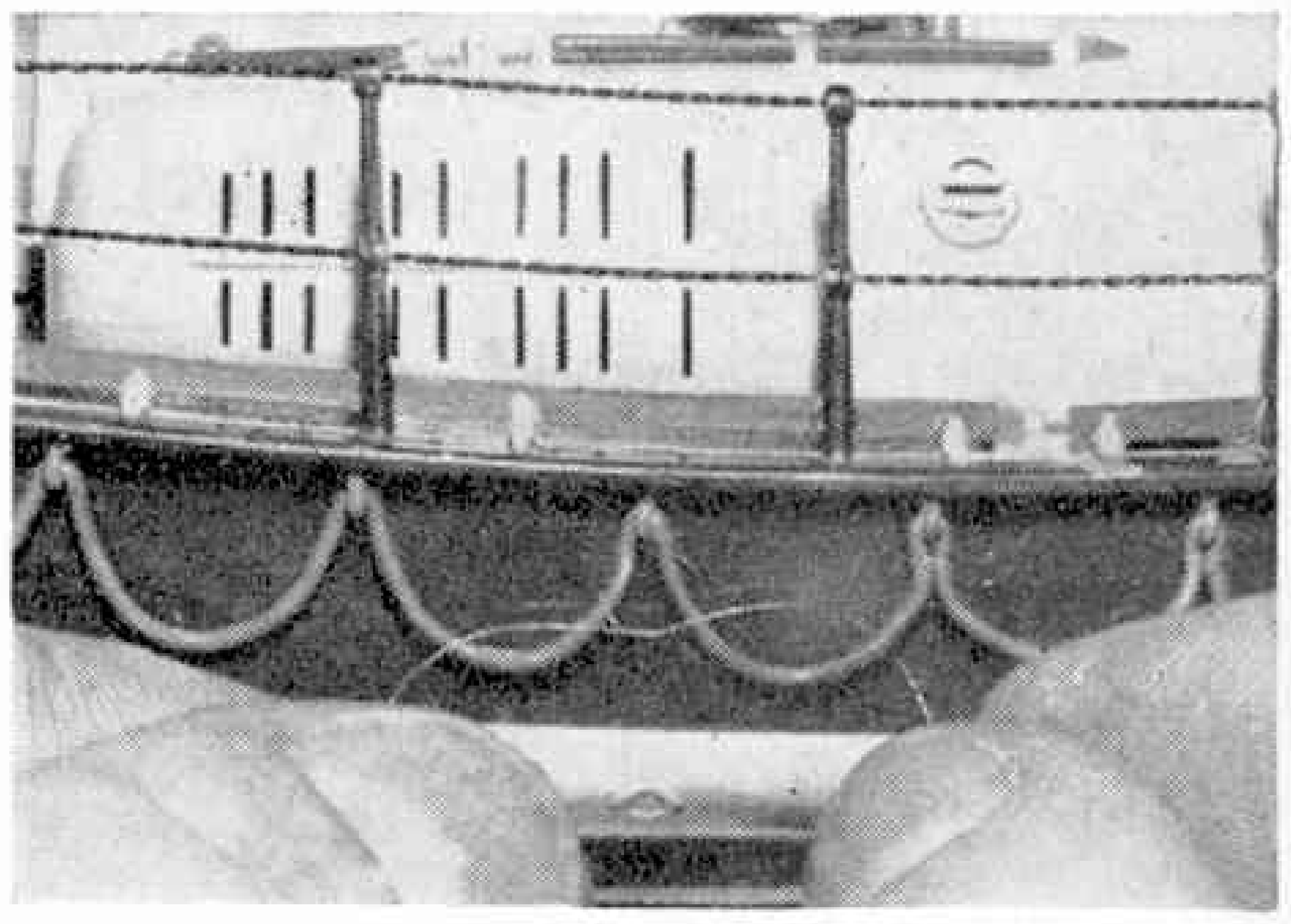
1 Paint the royal blue part of the hull after completing the detail painting of the upper works, but before fitting the handrails, etc. Use p.v.c. masking tape rather than the normal transparent kind. This will enable you to follow the curved water line

2 When the hull is quite dry, clean out any paint that may be clogging the holes, for the lifeline rings and deck stanchions, with a $\frac{1}{16}$ in. drill. Use a pair of tweezers to position the rather fiddly rings.

3 Allow the rings to dry *completely*, then thread a length of thin orange coloured plastic-covered radio hook-up wire through the lifeline rings. Bare the ends of the wire and twist it back upon itself through the end rings to secure it. Paint the bared wire orange.

4 Using Kleintex Invisible Thread or fine nylon, tie the lifelines together below the rings. This photograph also shows the 'rails' in place and painted

5 & 6 A cheap, effective yet simple method of producing simulated chain rails, is to take a loop of heavy fuse wire and, using a hook in the chuck of a drill brace, twisting the two strands together



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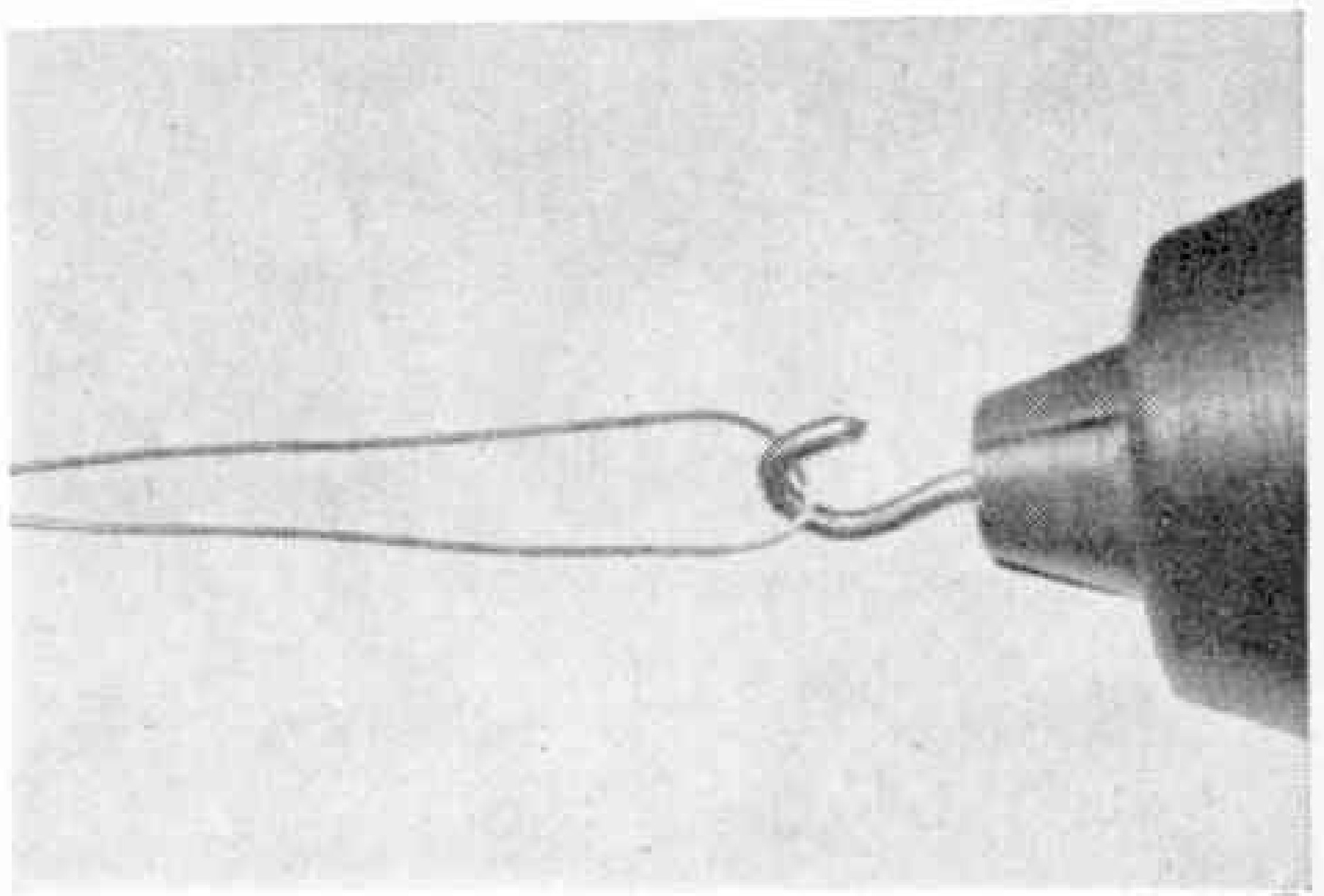

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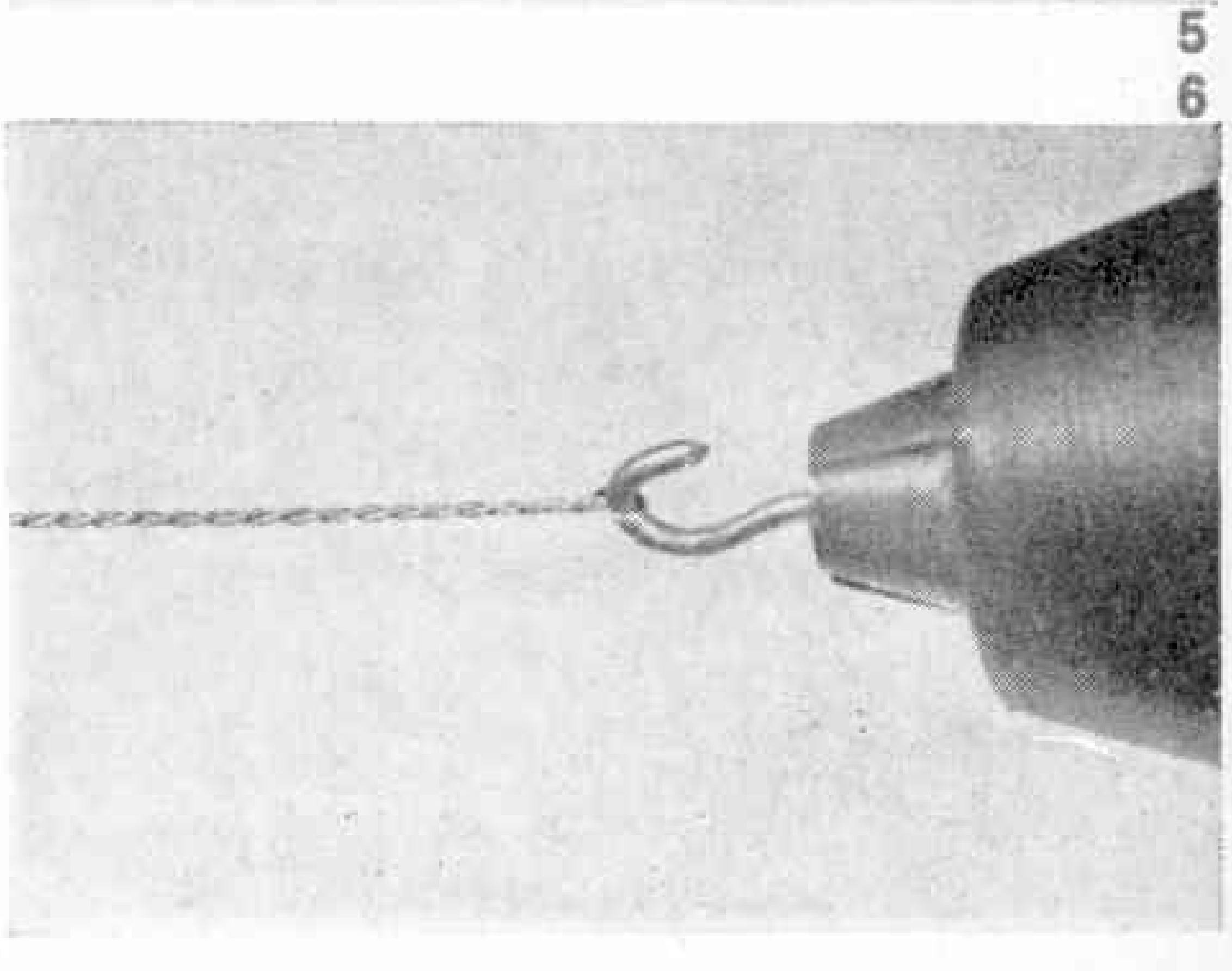


6

Runabout version of the Dolphin 16

BROOKLANDS Aviation introduced a runabout version of the Dolphin 16 at the 1967 Boat Show, so this is yet another model you can build from the *Meccano Magazine* plans (January issue). The drawings on this page show the modifications involved.

If you are starting from scratch, all the original plan details apply up to the deck line with one exception. Bulkhead 3 needs to be modified as shown in Fig. 1, i.e. the whole of the centre part is removed down to the floor line. Since this will result in a weak bulkhead for assembly a temporary brace should be cemented across. This brace is then removed when the hull is planked up. If you have a ready-built hull you wish to convert, the whole cabin superstructure is removed and bulkhead 3 then trimmed to the new shape.

The two $\frac{1}{4}$ in. square floor beams should be extended in length to finish on bulkhead 2 and not bulkhead 3, as on the cabin version (original plan). The floor is then completely filled in with sheet from bulkhead 2 right back to bulkhead 5.

Two front seats are made from block and $\frac{1}{4}$ in. sheet balsa, as shown in Fig. 2; also two rear seats which are located sideways and face inwards. Cover with thin material to represent upholstery and then cement in place to the cockpit floor—see also Fig. 3 for seat positions.

This virtually completes the runabout version except for the windshield. Two triangular side frames are constructed for this from $\frac{3}{32}$ in. square hardwood and cemented to the deck. Two additional pieces of $\frac{3}{32}$ in. square strip are then steamed to a curve and cemented between the two side frames, one at the bottom resting on the deck, and the other between the tops of the two triangular side frames. Varnish these frame members and then glaze the windshield with three separate pieces of clear acetate sheet attached to the frames with thin cement. Finally add the two coaming strips from $\frac{1}{8}$ in. square balsa which run from the end of the side frames to the transom.

A new method of getting a quick, high-gloss finish for your Dolphin (or any other hard chine hull) is to cover with 'Monokote'. This is a self-coloured self-adhesive plastic film, specially developed for covering model aircraft, but equally suited to boats.

When covering with 'Monokote' the hull should not be treated with sanding sealer, but simply sanded down as smooth as possible. Any irregularities or poor joints will show up through the film. The hull is then covered in five pieces—the two sides, the two bottom panels and the transom. Cut out 'Monokote' panels slightly oversize and start with the transom as the easiest.

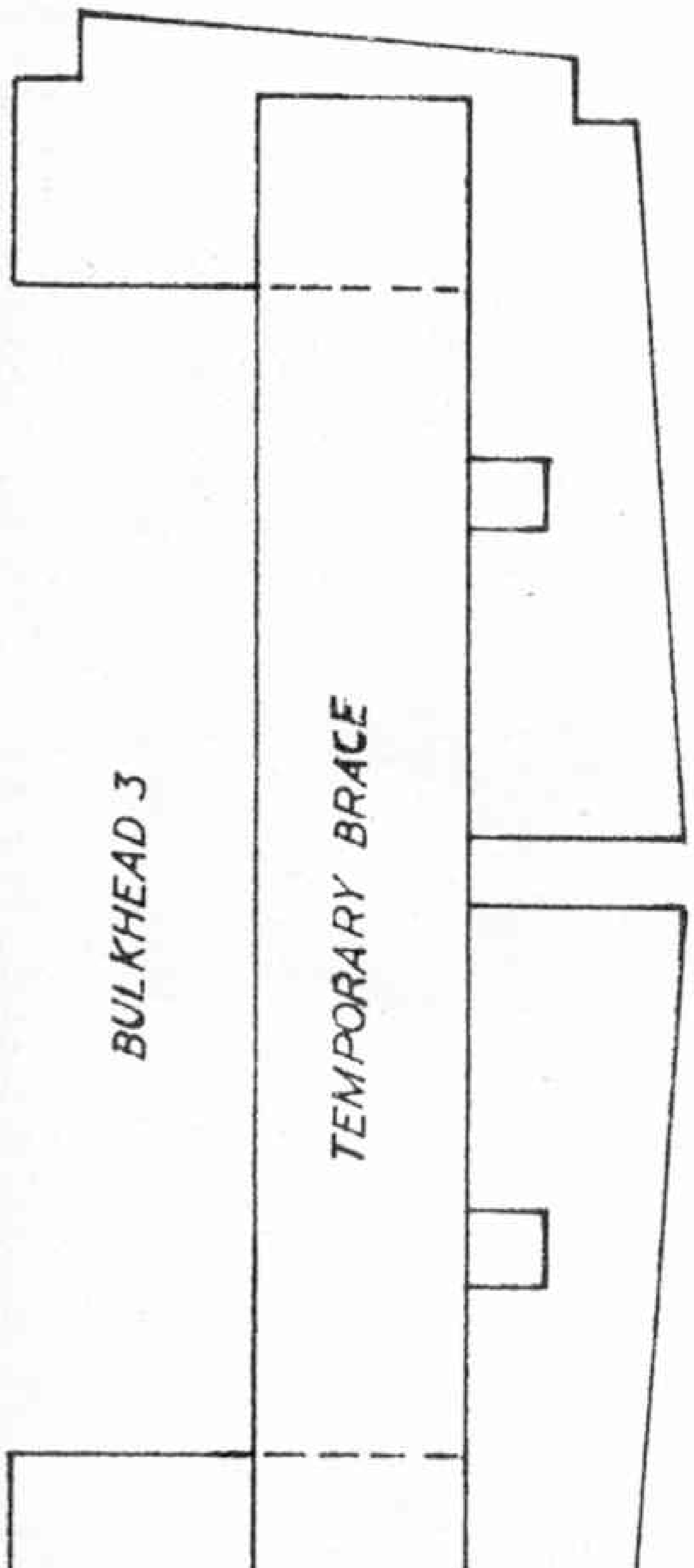
Peel the film off its backing paper and lay in place on the transom. Then using a domestic iron set for a fairly low heat, iron over the 'Monokote' around the edges of the transom. This will cause it to stick down at the edges. Finally lightly iron over the whole area to stick all the film down permanently. Trim off the edges and iron these down in place. This is a little more tricky, but not difficult. If a wrinkle appears where an edge is turned over, slit this with a razor blade and re-iron down smooth.

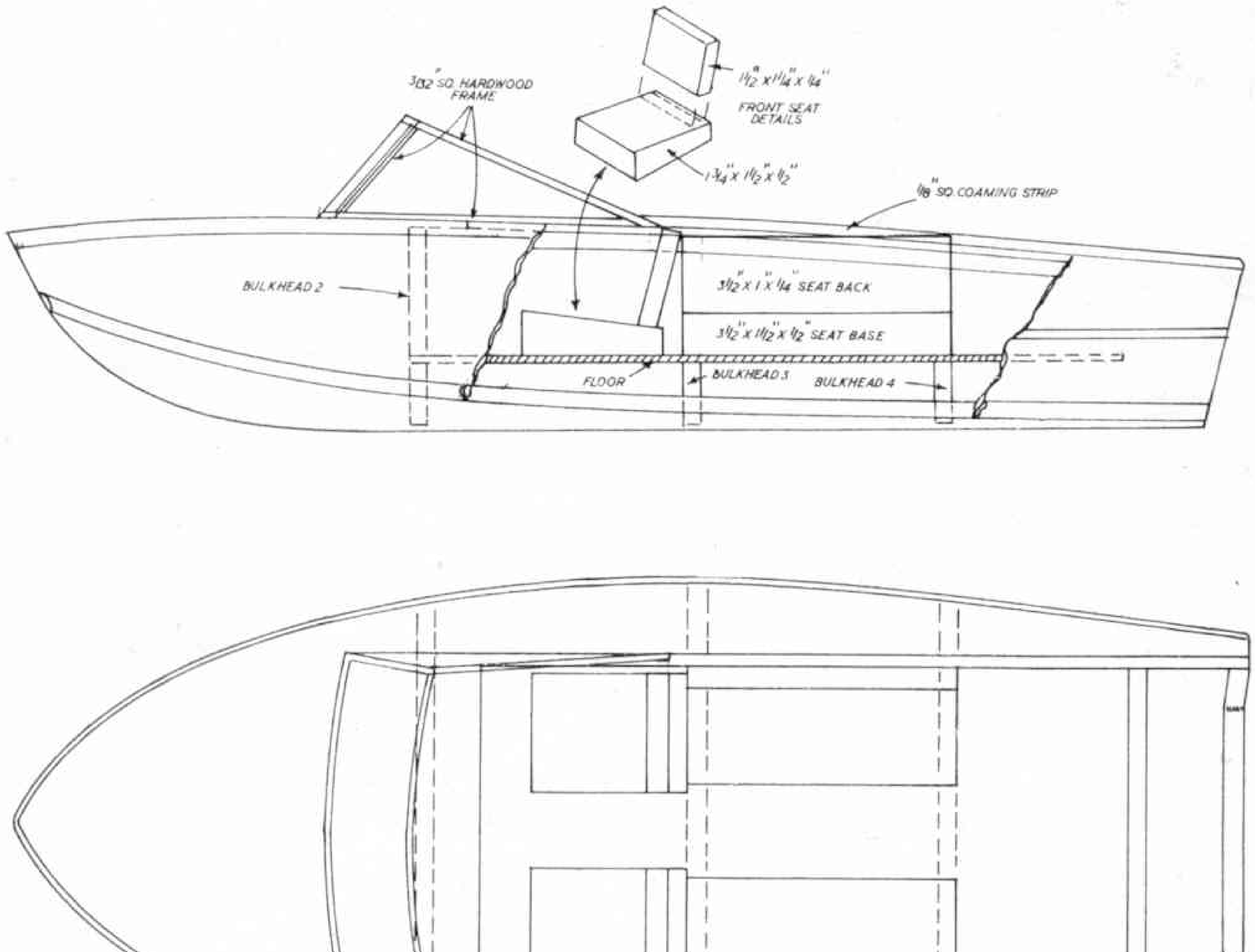
Next the two side panels should be covered in a similar manner. Trim off flush with the deck line but leave about $\frac{3}{4}$ in. overlapping the chine line. This overlap is then 'turned over' the chine by ironing in place. Finally cover the two bottom panels, overlapping each panel by $\frac{3}{4}$ in. to $\frac{1}{2}$ in. along the bottom centre line. Trim off fairly close to the chine line—about $\frac{1}{8}$ in. and 'turn over' onto the sides by ironing. This will give a rather ragged appearance at the overlap, especially when using different colours for the sides and bottom, but this is then covered with a thin parallel strip of 'Monokote' in contrasting colours. Locate this strip carefully and then iron over to bond it permanently in position.

You can also cover the deck in 'Monokote' as well, and use additional strips of 'Monokote' for further trim. It is available in eight different colours and although large sheets are expensive (25s. each) most model shops will sell part sheets. Remember, too, that you save all the cost of sanding sealer and dopes normally used for finishing—and can complete a high gloss colour scheme in a fraction of the time needed with conventional finishing methods.

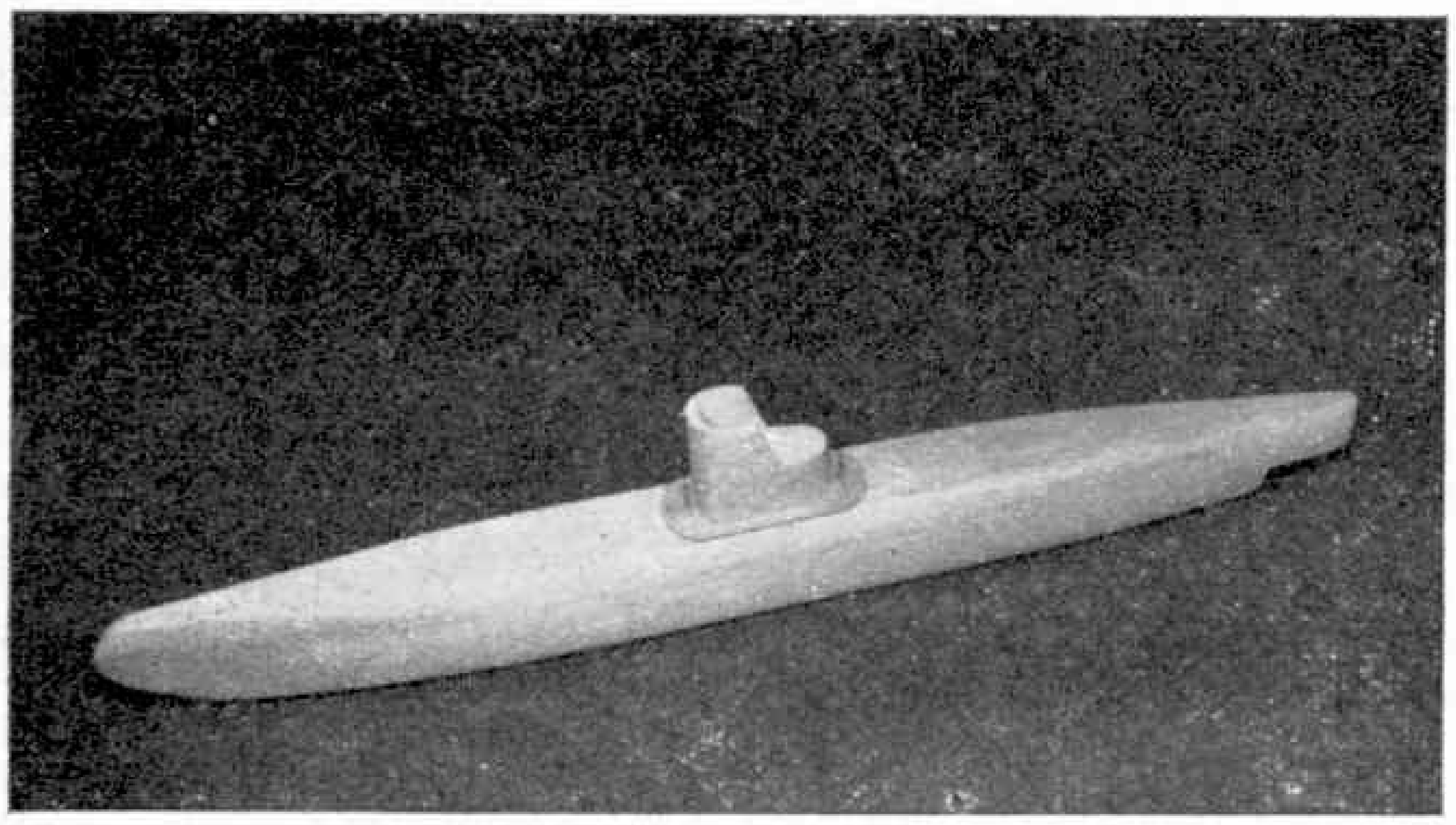
Suggested colour schemes are:

Hull sides	**Hull bottom**	**Bottop (i.e. the strip separating the top and bottom colours)**	**Deck**
blue	white	gold	white
blue	red	white	white
red	blue	white	white
white	red or blue	blue or red	blue
white	white	red or blue	red or blue





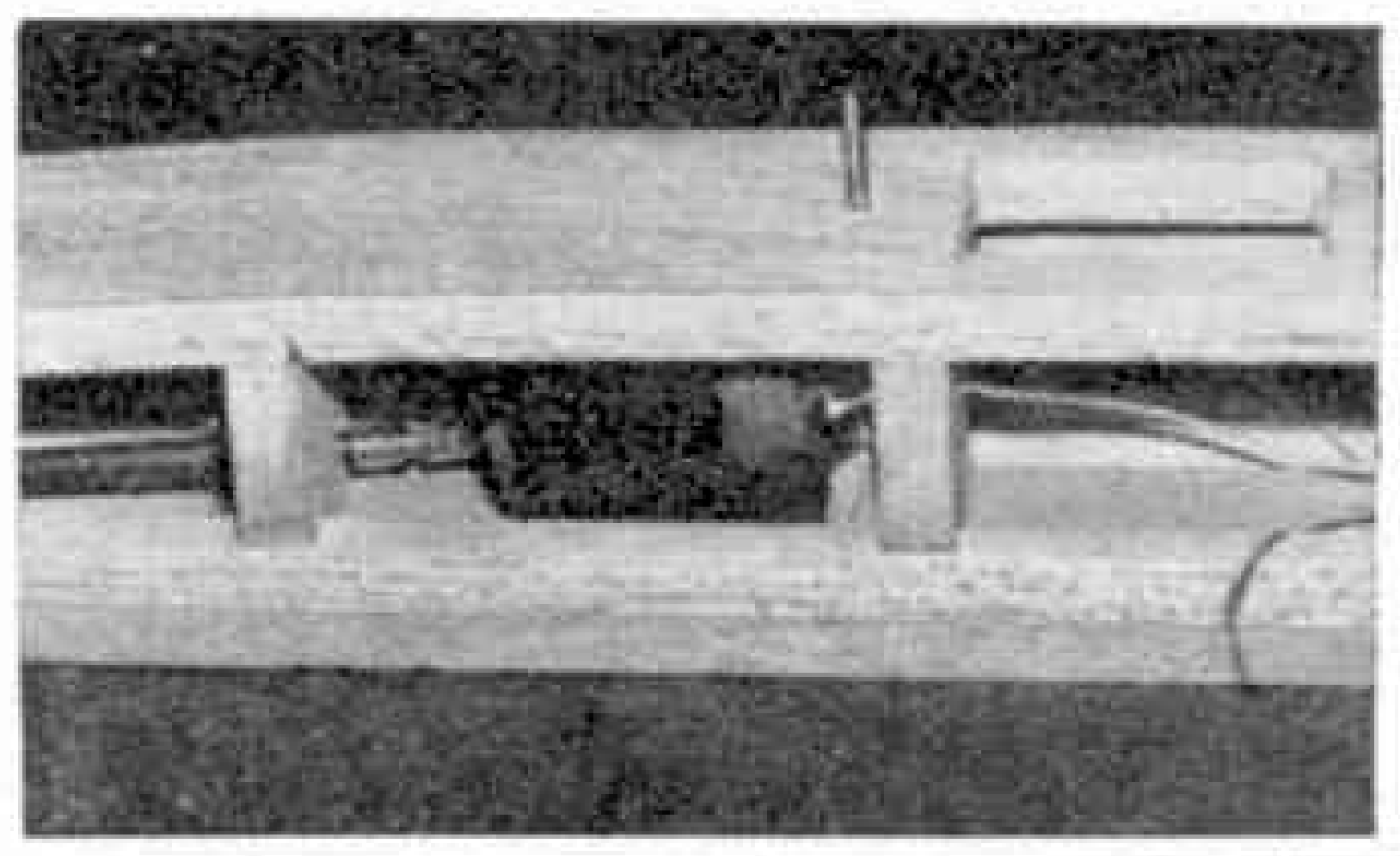
Solarbo BALSA

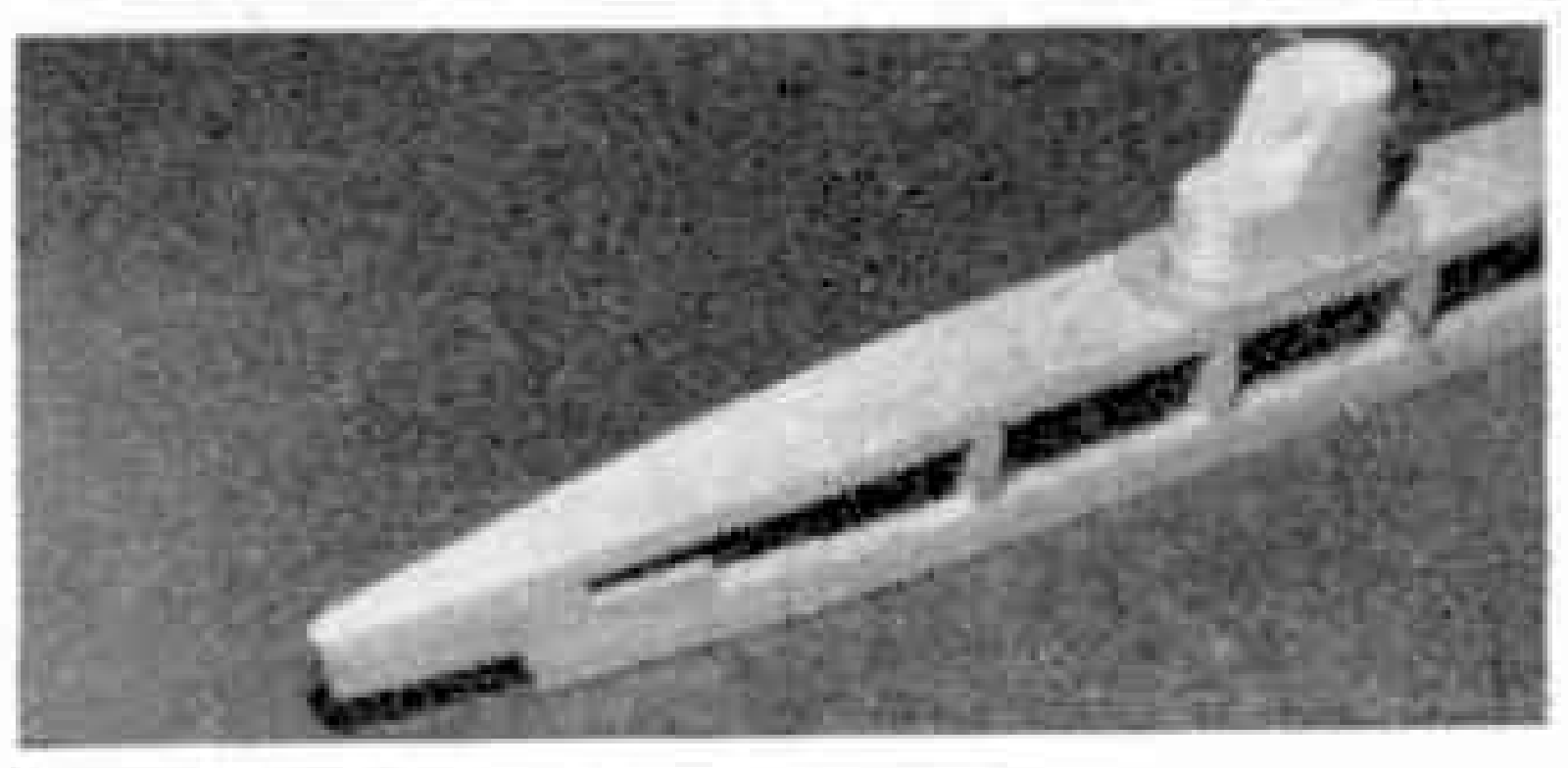


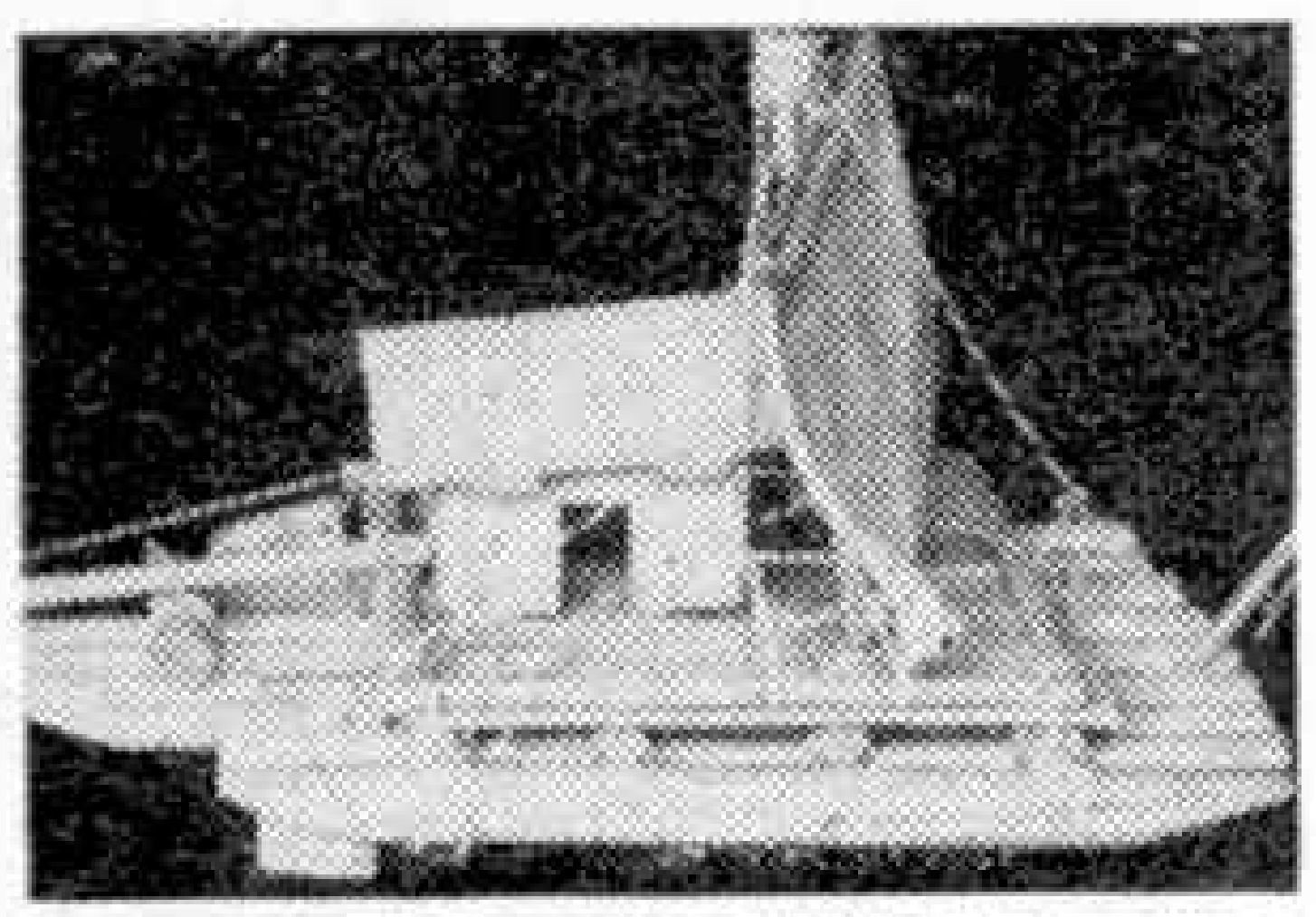
BUILDING "FLIPPER"

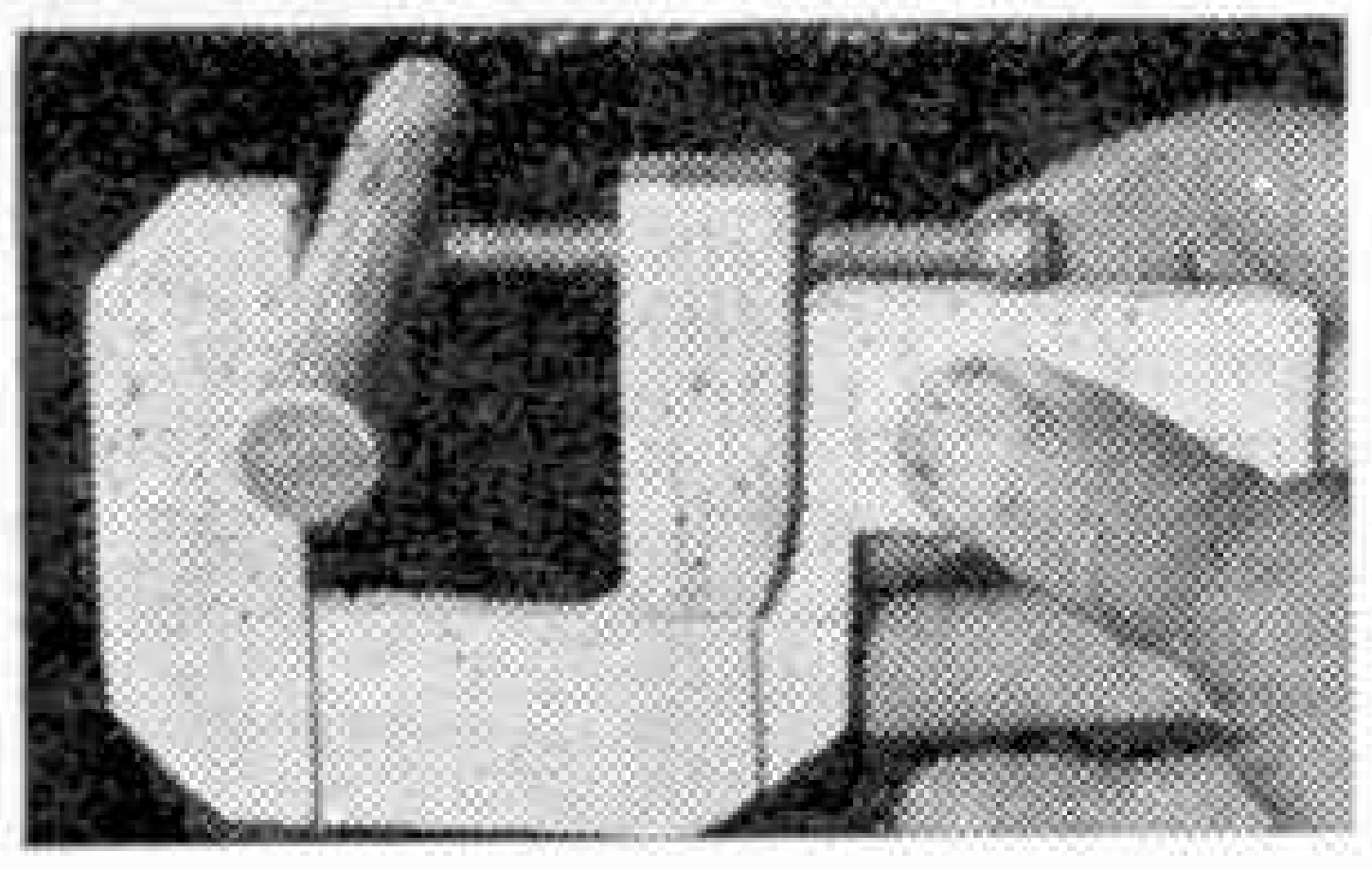
Only balsa could produce such an easy and rapid form of construction for a working model submarine . . . that's why 'Flipper' was designed as a **balsa** model. Don't make any mistake about thinking of balsa as a weak material either—'Flipper' is a really tough and robust model which won't be holed by any 'enemy' action on the pond! But just to be sure, use the best balsa. That's SOLARBO BALSA, specially graded and selected for modelling use—quality guaranteed and quite the best balsa you can buy.

Submarines, as a matter of interest, were responsible for the initial marketing of balsa on a commercial scale as a substitute for cork during World War I (the submarine blockade cutting off cork supplies to America). Prior to that, balsa was only a 'novelty'. Nowadays, of course, Balsa is a standard material for constructing aircraft, boats and other models, as well as being used in their full size counterparts. A glass fibre-balsa 'sandwich' is the latest method of full size boat construction (but so far, not yet for submarines!)









MORE MODELS

PLANS are available of a number of simple Balsa models, originally designed for schools but equally suitable for home use. Cost is nominal only - ANY FOUR PLANS for 1/- (post free); except the SLIDE RULE which is supplied as a COMPLETE KIT (3/6 post free). Use the coupon below to order to your choice.

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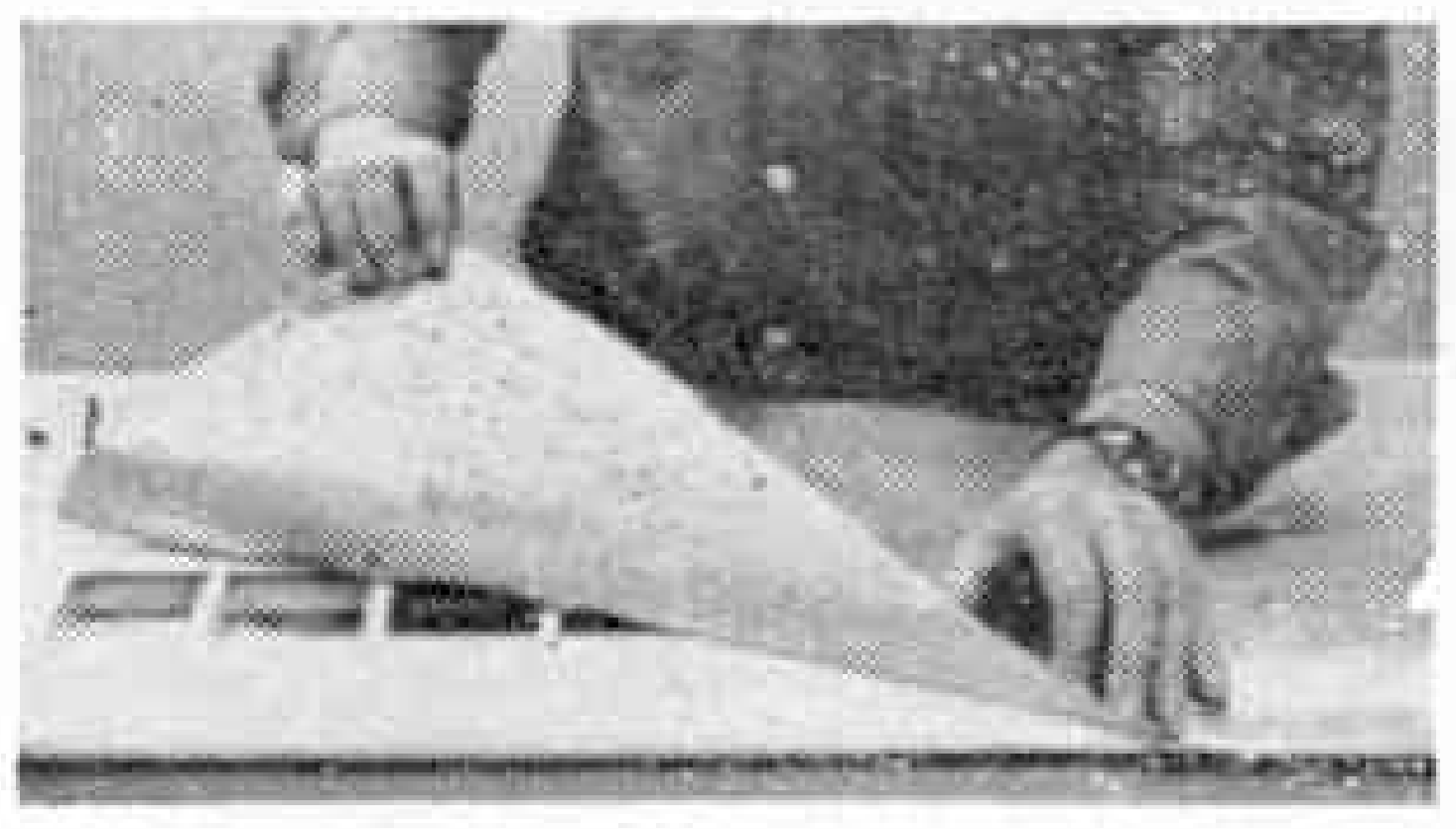
It's an ABSOLUTELY NEW TECHNIQUE . . . a self-adhesive, self-coloured plastic film which you cut out and press in place and then lightly iron to tauten and fix permanently. It's FAST and EASY to use and you get a TOUGH, HIGH GLOSS COLOUR FINISH in a fraction of the time it takes with paints or dopes. No irritating smell either, and you don't have to wait for it to dry. Specially developed as a MODEL AIRCRAFT COVERING, it is just as suitable for other types of models where you want a HIGH GLOSS EXHIBITION QUALITY FINISH (and no waiting or tedious sanding down between coats). Multi-colour schemes and trim are easy to do, too. Just cut patterns in contrasting colour and iron in place.

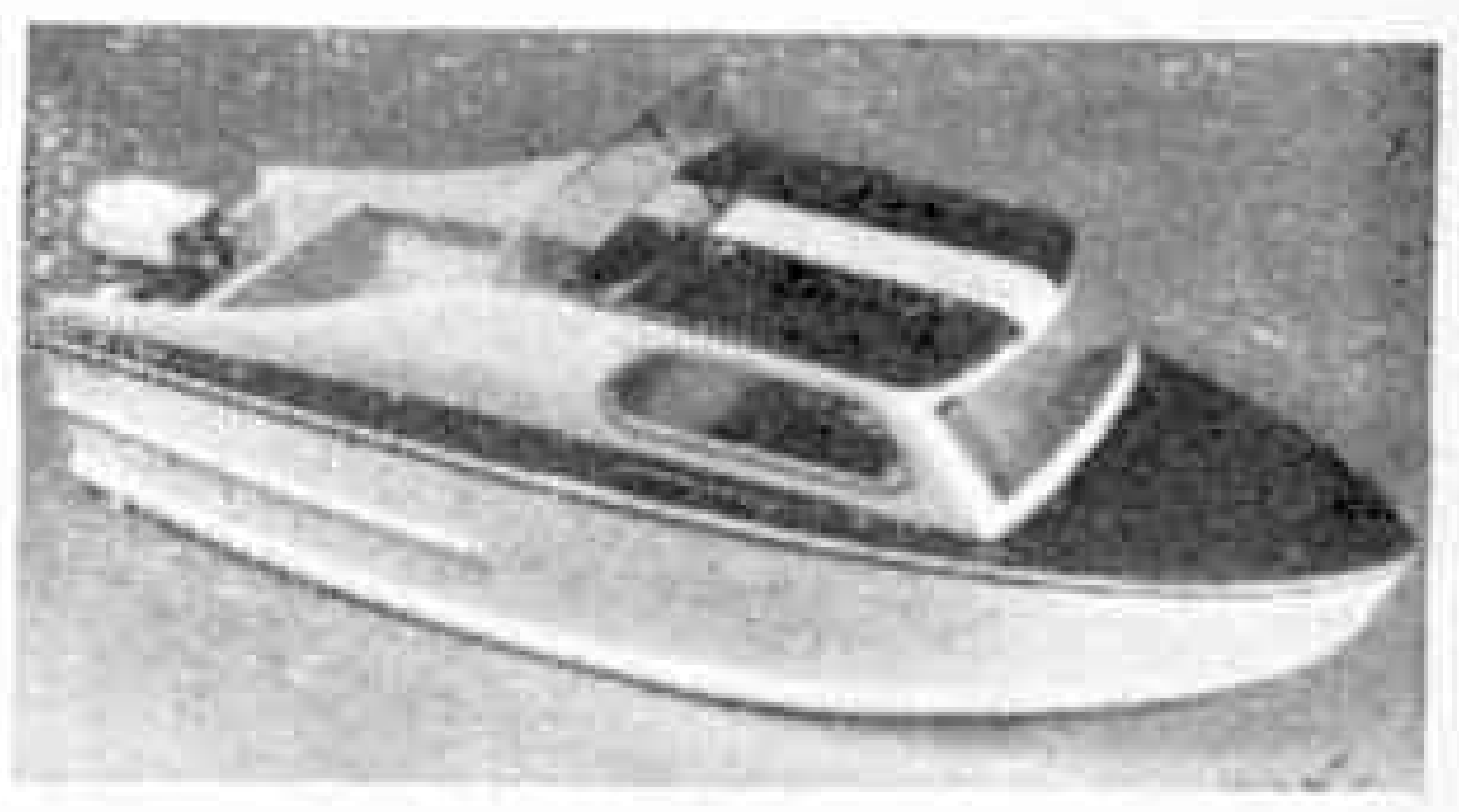


BOATS . . .

Specially suitable for covering and finishing hard chine hulls (like the Dolphin 16) in a fraction of the time needed with old fashioned painting. You get a perfectly even high gloss finish, too—first time! Rounded hulls are a little more difficult to cope with and you will usually have to cover in strips.

AIRCRAFT . . .

Particularly suitable for control-liners or large free flight models, MONOKOTE is lighter than nylon covering and dopes, and MUCH TOUGHER, too. Completely moistureproof, fuelproof and fadeproof so that your model stays new looking with that superb high gloss finish.



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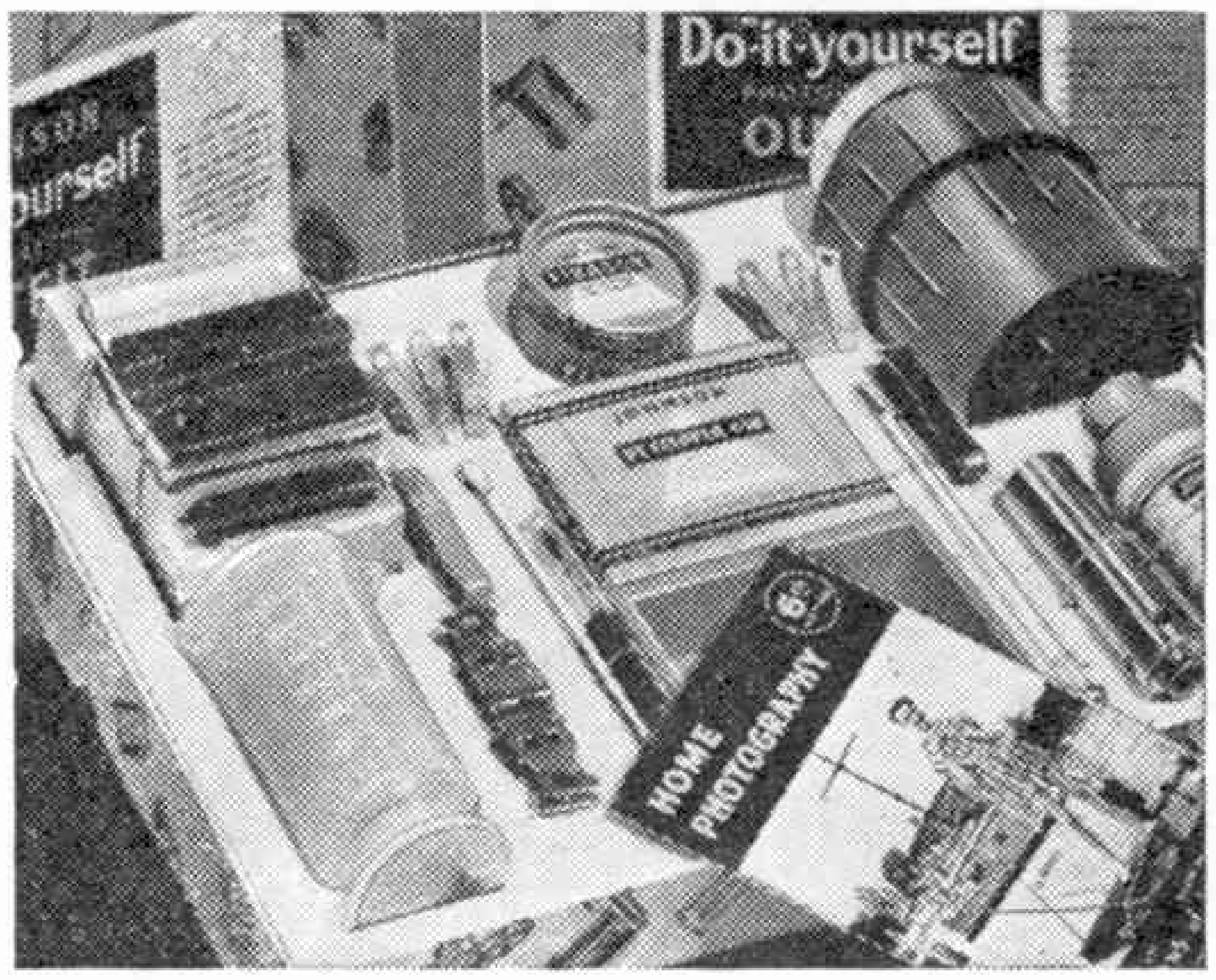

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A vernier rule in Balsa by Ron Warring

HERE is a design for another 'precision' instrument which you can make in balsa for a mere fraction of the cost of a ready-made article. It is made to measure dimensions accurately down to the nearest one hundredth of an inch; but to be accurate it must be *made* accurately.

Following is a list of parts required, each of which must be cut as carefully as possible to the dimensions given.

Body parts: one each of the following sizes
6 in. by 1⅝ in. cut from 3/16 in. sheet
6 in. length of ⅜ in. by ⅛ in. strip*
6 in. length of ½ in. by ⅛ in. strip*
6 in. by ⅝ in. cut from ⅛ in. sheet
6 in. by ¾ in. cut from ⅛ in. sheet
(* Note: these two parts can also be cut from ⅛ in. sheet, if preferred.)

Slide parts: one each of the following sizes
6½ in. by ⅝ in. cut from ⅛ in. sheet
6½ in. by ⅜ in. by ⅛ in. strip (or cut from ⅛ in. sheet)
1⅝ in. by ½ in. cut from 3/16 in. sheet.

A plan of the complete rule is shown in Fig. 1, together with cross sections of the body and slide. This is simply a guide. Assembly details of the body and slide are shown in Figs. 2 and 3, respectively, the various parts being cemented together. It makes for greater accuracy if the *slide* is made first and allowed to set, taking care to fix the slide end piece exactly at right angles and with the top edge exactly ⅜ in. above the widest long strip. The finished slide can then be laid on the body base piece as a guide for positioning the body strips, but *do not leave the slide in position* whilst the body joints are setting. It could get cemented up solid with the body!

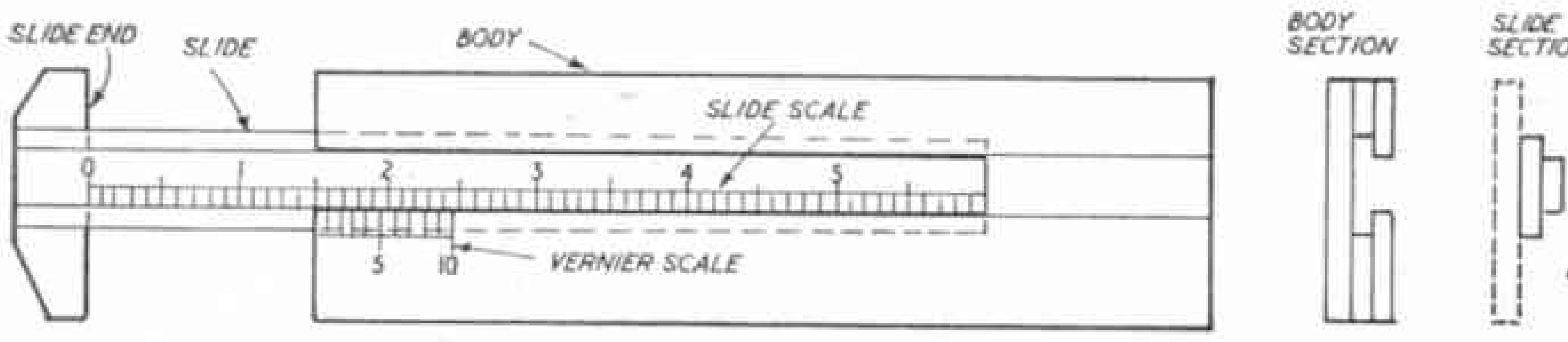
Having completed both the body and slide assemblies, check that the slide fits into the body and can be slid easily backwards and forwards without rocking. If you have not got a good fit, or the slide end does not butt flush against the end of the body when the slide is fully closed, it will be better to remake the inaccurate part rather than accept a poor fit which will affect the accuracy of the rule.

The two scales are shown full size. You can trace these patterns on the slide and body and mark out with a ball point pen; but it will be much easier (and make a more accurate rule) if these paper scales are cut out and cemented in place on the rule, as shown in Fig. 5. Note particularly how the scales have to line up. The slide scale figure 0 starts exactly ½ in. in from the far end of the slide so that when the slide is fully closed the '0' reading comes exactly at the edge of the body. The vernier scale is positioned with its left-hand edge exactly at the edge of the body.

Now a few notes on how to use the rule and read the vernier scale, for those not familiar with the method. The measurement required is made by extending the slide until the dimension required is exactly contained within the jaws of the rule—see Fig. 6. If it is a solid object you are measuring you can actually grip this between the jaws.

Now read the equivalent measurement on the slide scale, which is graduated in inches and tenths, reading the dimension against the edge of the body. Unless the dimension is an exact number of tenths you will get a reading of so many inches and so many tenths, plus a bit more. Thus, in Fig. 7, the reading is 1 in. and 4 tenths (1·4 in.), plus a bit more.

Now look at the vernier scale and see which of the vernier lines is *exactly in line* with any line on the tenths scale (on the slide). Only one vernier scale reading will be exactly lined up in this manner. All the others will be a little bit off to one side or the other of the tenths graduations above it. The one which *is* in line will be the number of *hundredths*, reading the vernier scale from 0 to 10 from left to right. It is very simple to read hundredths of an inch in this way—and very accurate if you have made your rule accurately.



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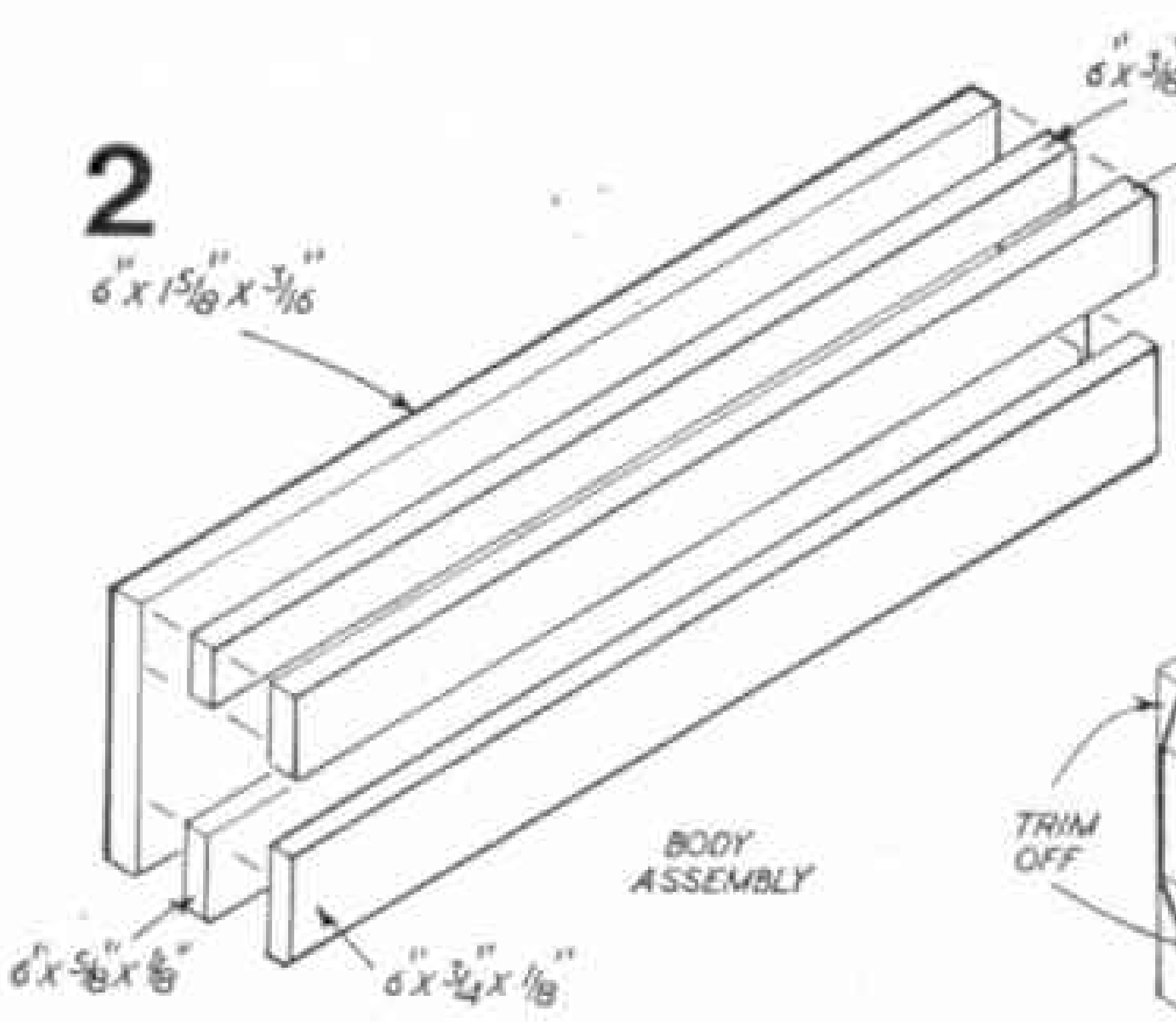
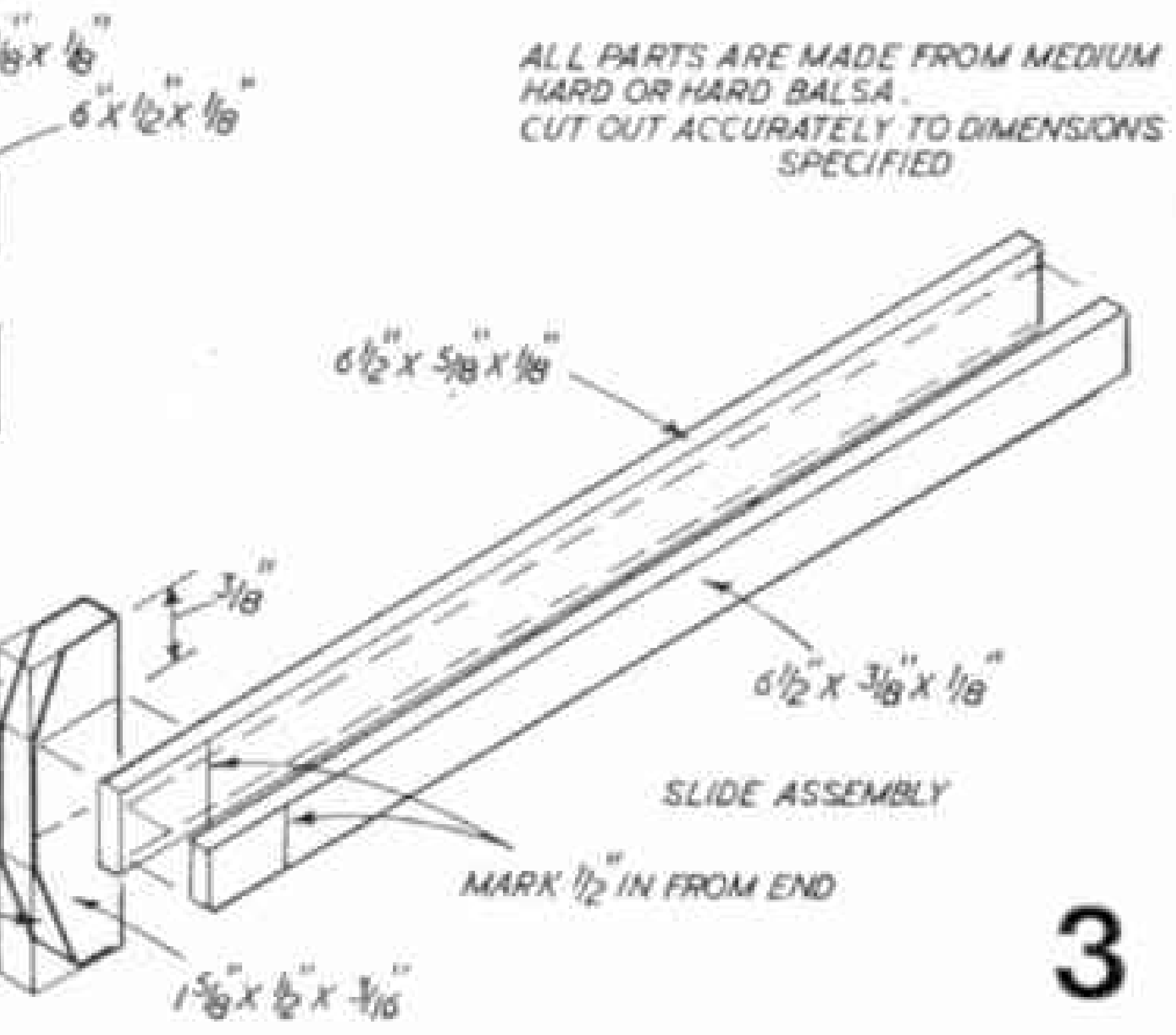
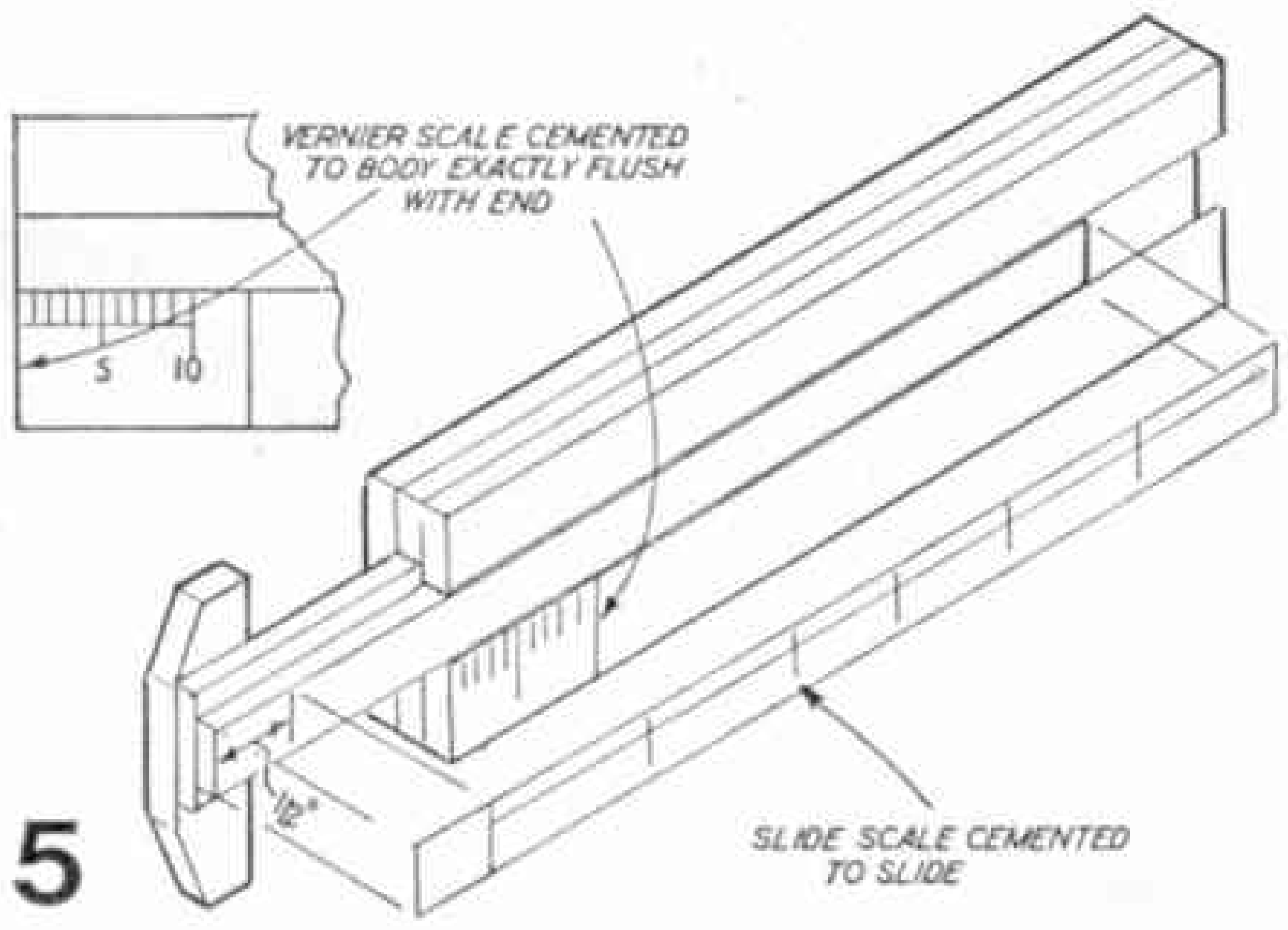


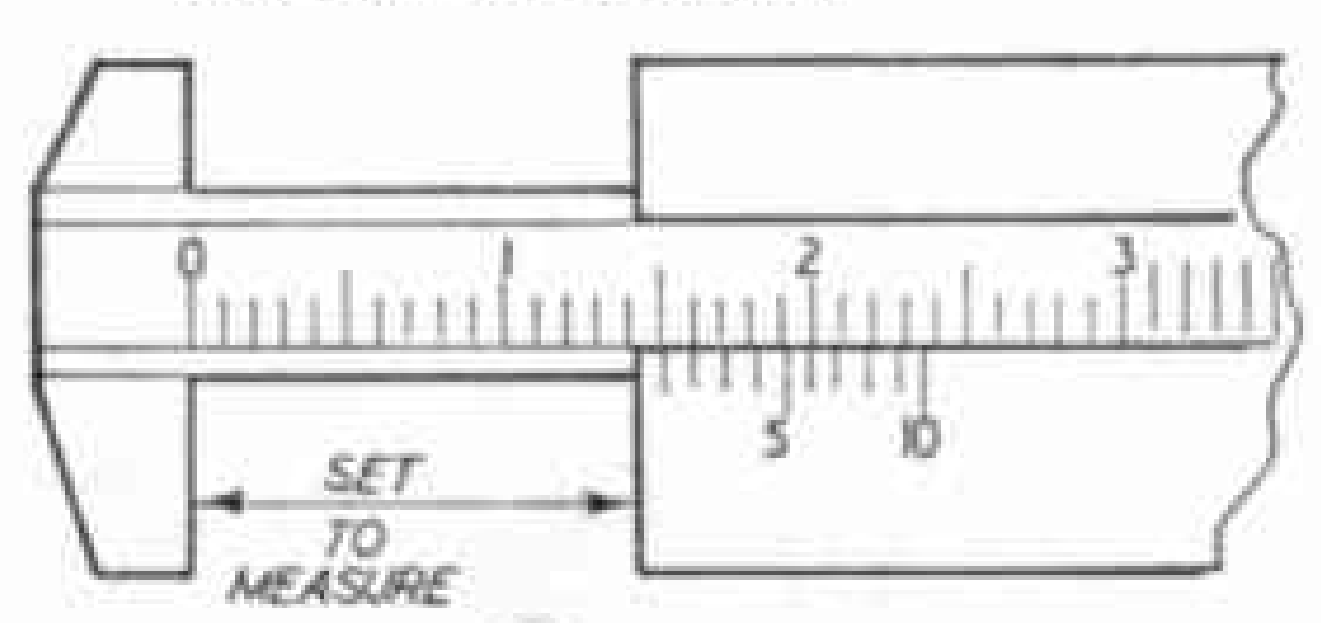

ALL PARTS ARE MADE FROM MEDIUM HARD OR HARD BALSA.
CUT OUT ACCURATELY TO DIMENSIONS SPECIFIED
6½"x5/8"x1/8"
3/8"
6½"x3/8"x1/8"
TRIM OFF
SLIDE ASSEMBLY
MARK ½" IN FROM END
1 5/8"x½"x3/16"

3


VERNIER SCALE CEMENTED TO BODY EXACTLY FLUSH WITH END
5
10
½"
SLIDE SCALE CEMENTED TO SLIDE

5

HOW TO READ THE SCALES



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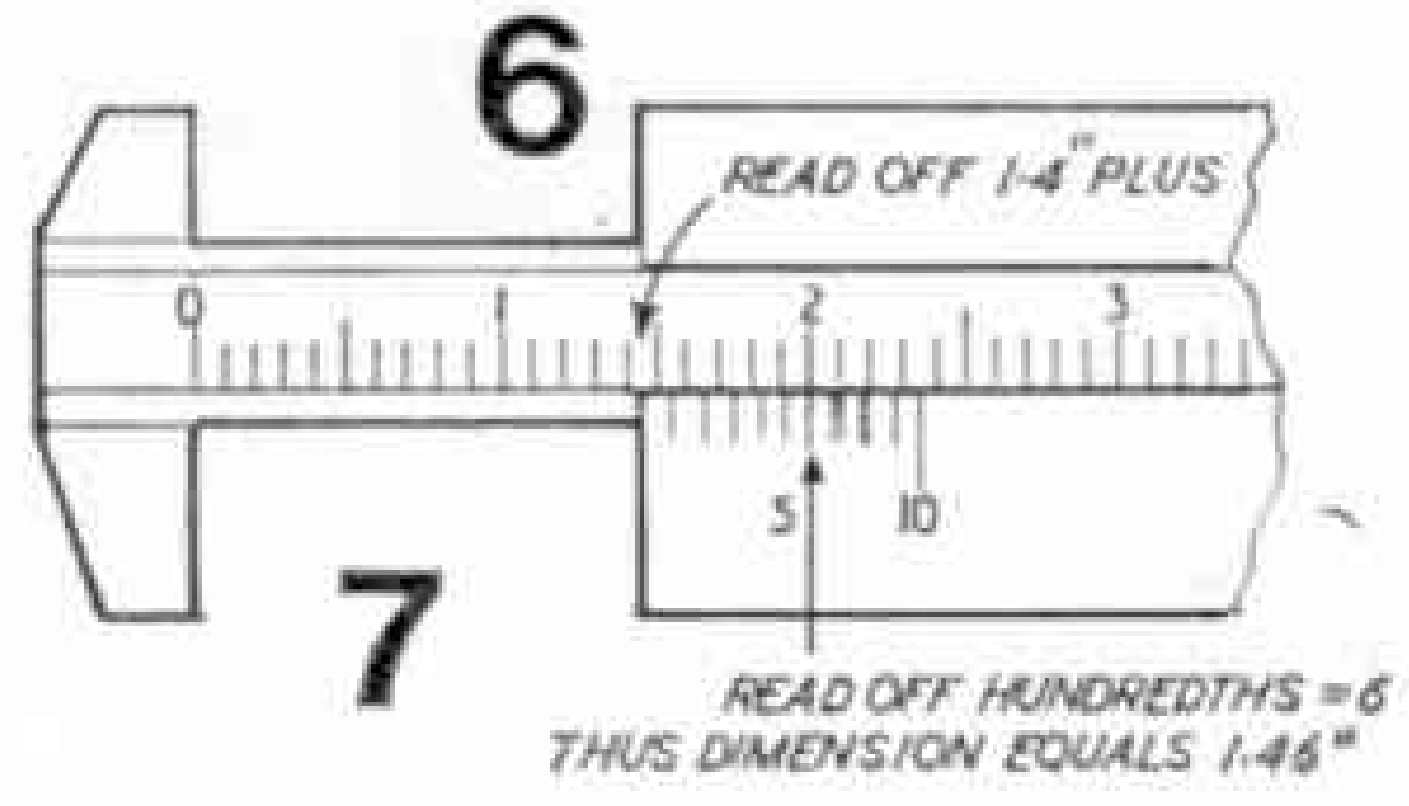
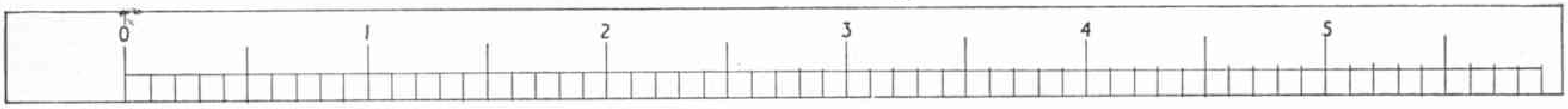
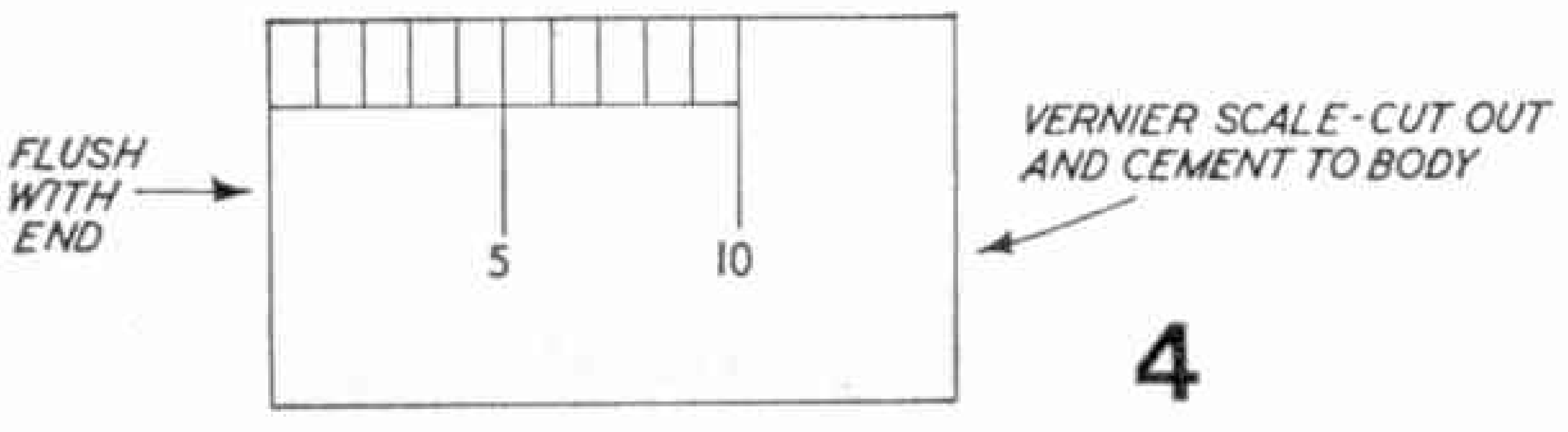


7

CUT OUT THIS SCALE AND CEMENT TO SLIDE





VERNIER SCALE-CUT OUT AND CEMENT TO BODY

4

The Ceiling Walker from p.11

been positioned in the hub slots.

Each rotor is mounted on a 20 gauge wire shaft passed through the bearing and then bent over at the end and turned back into the hub. Be sure to fit a small cup washer between the hub and the bearing.

Finally cut the 'spike' from ⅛ in. square balsa, notch to fit over the shaft wire on top of the hub and then cement to the exact centre of the hub, and *upright*.

The best size of rubber motor can only be established by trial and error. If you have built your model from light balsa a single loop of 1/32 in. square rubber should be sufficient.

The simplest way of adjusting the power is then by increasing or decreasing the *length* of the motor. Increasing the motor length will reduce the rate of climb and at the same time increase the length of power run. Reducing the length of motor will increase the power available for climb, but reduce the length of motor run; but if this still does not give enough power to make the model climb properly you will have to increase the *section* of the rubber and start again.

Try experimenting with different motor lengths and sections until you get the best results for flying in the space available. It is generally best to err slightly on the side of too much, rather than too little power with a low ceiling as this will tend to hold the model steadier when the 'spike' has reached the ceiling.

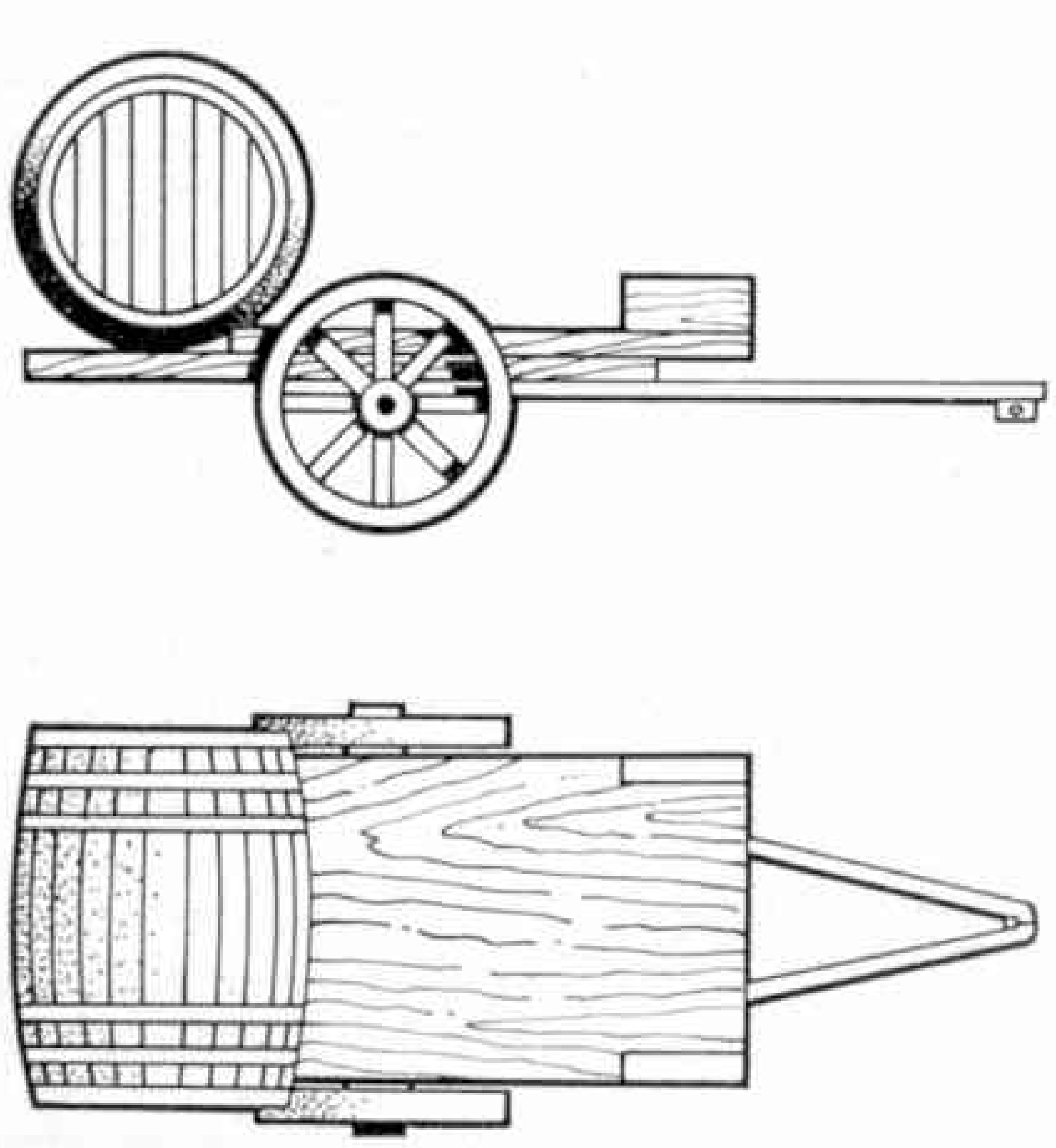
If you find the model wobbles too much when the 'spike' has reached the ceiling, allowing the top rotor blades to strike the ceiling, this may be caused by unbalance on the rotors, or the spike not being located centrally on the top rotor hub. If necessary, increase the length of the spike to, say, 2 in.

This model *can* be flown outdoors, but only on very calm days. Performance as an 'outdoor' model will *not* be improved, incidentally, by increasing the size of the model. It will be improved, though, if you increase the *length* of the motor. There is no reason why this should not be as much as twice the length of the stick, although this will make the motor rather more difficult to wind up. It is best in such a case to remove the motor from one of the shafts and wind with a winder (e.g. a hook in a hand drill); then replace on the shaft when fully wound.

Note the direction of winding up for the model to fly properly—and also remember that when winding the rotor at the opposite end of the model it must be held so that it cannot rotate.

Home of the fighting scouts

In this, the fourth instalment of this series, Ken McDonough describes how you can add some really authentic details to your completed aerodrome. The photographs opposite demonstrate the realism of Ken's models, and the drawings are reproduced full-size for 1/72nd scale.



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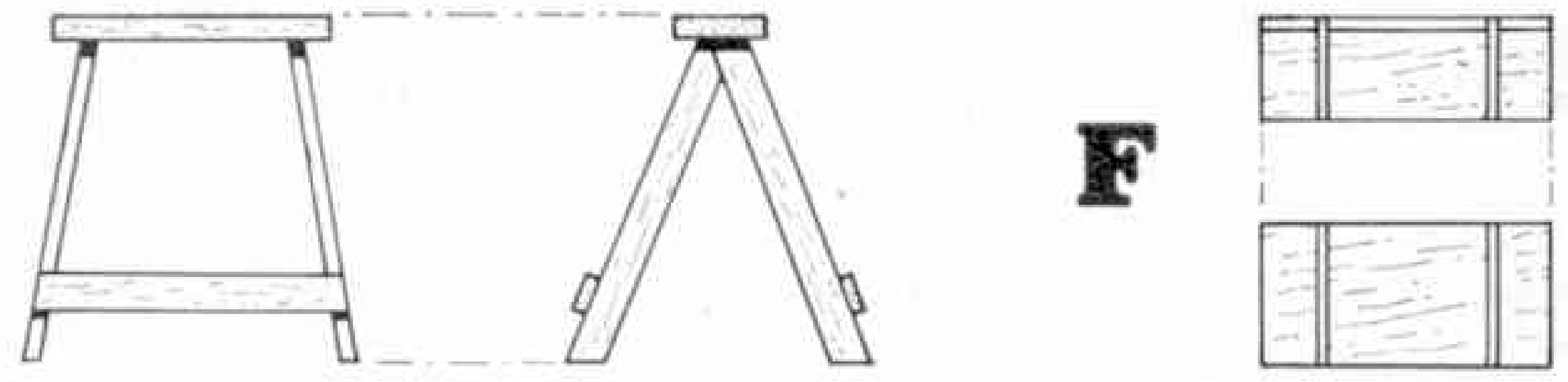

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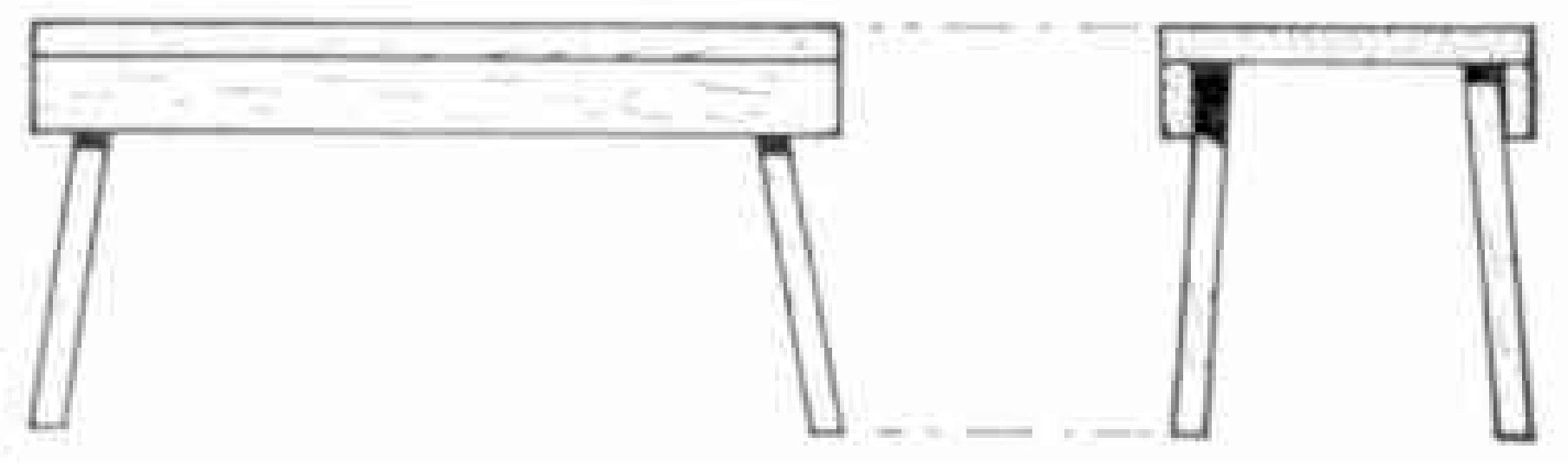

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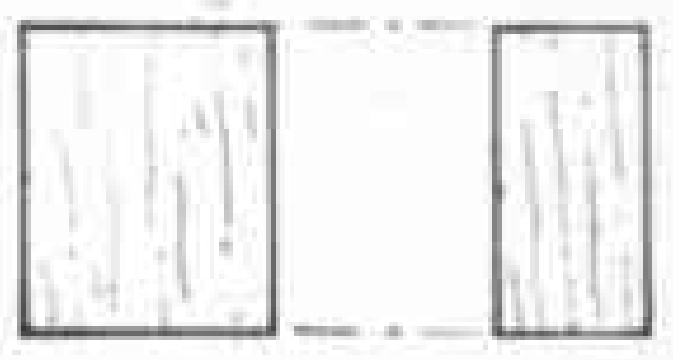

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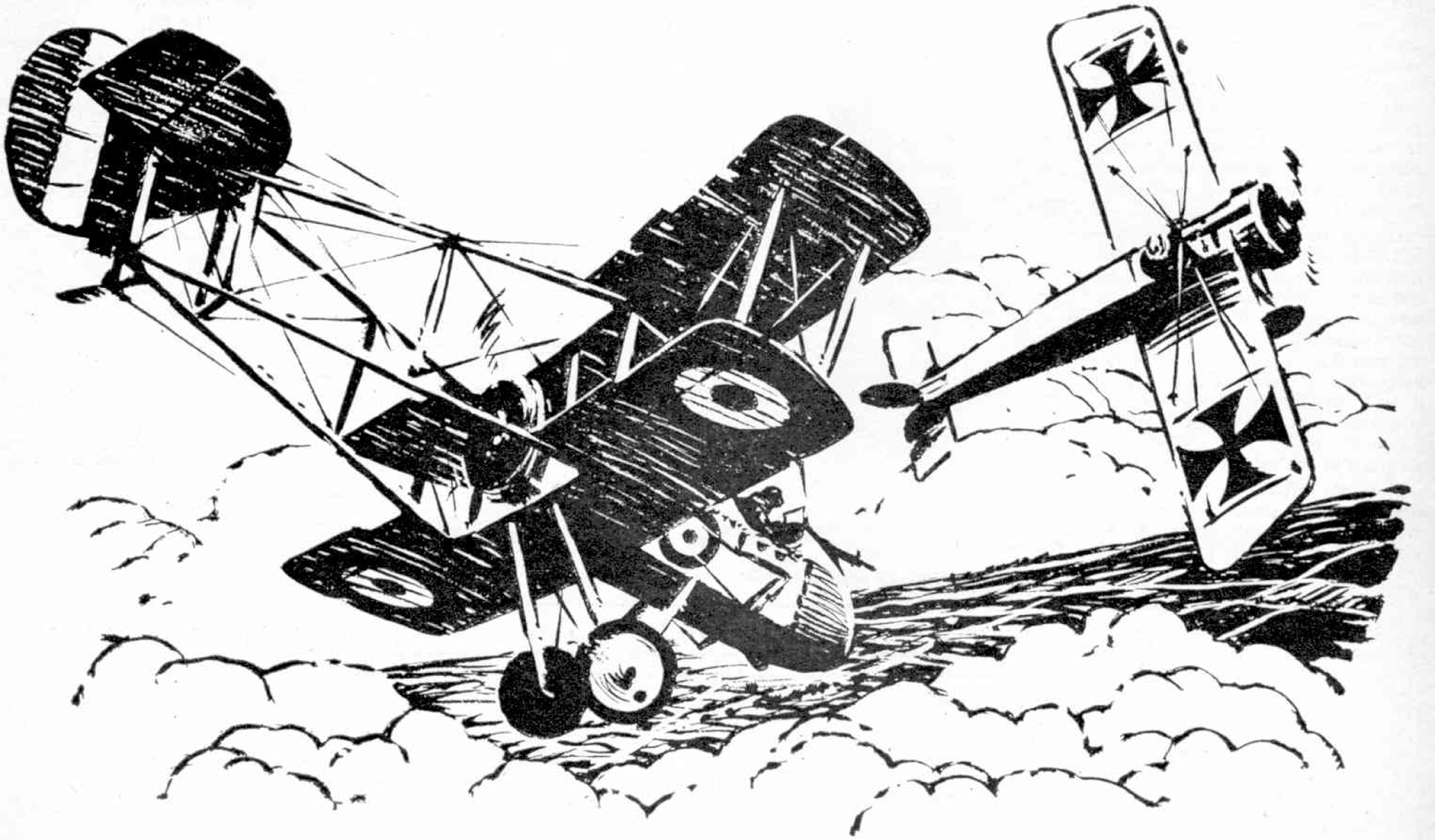
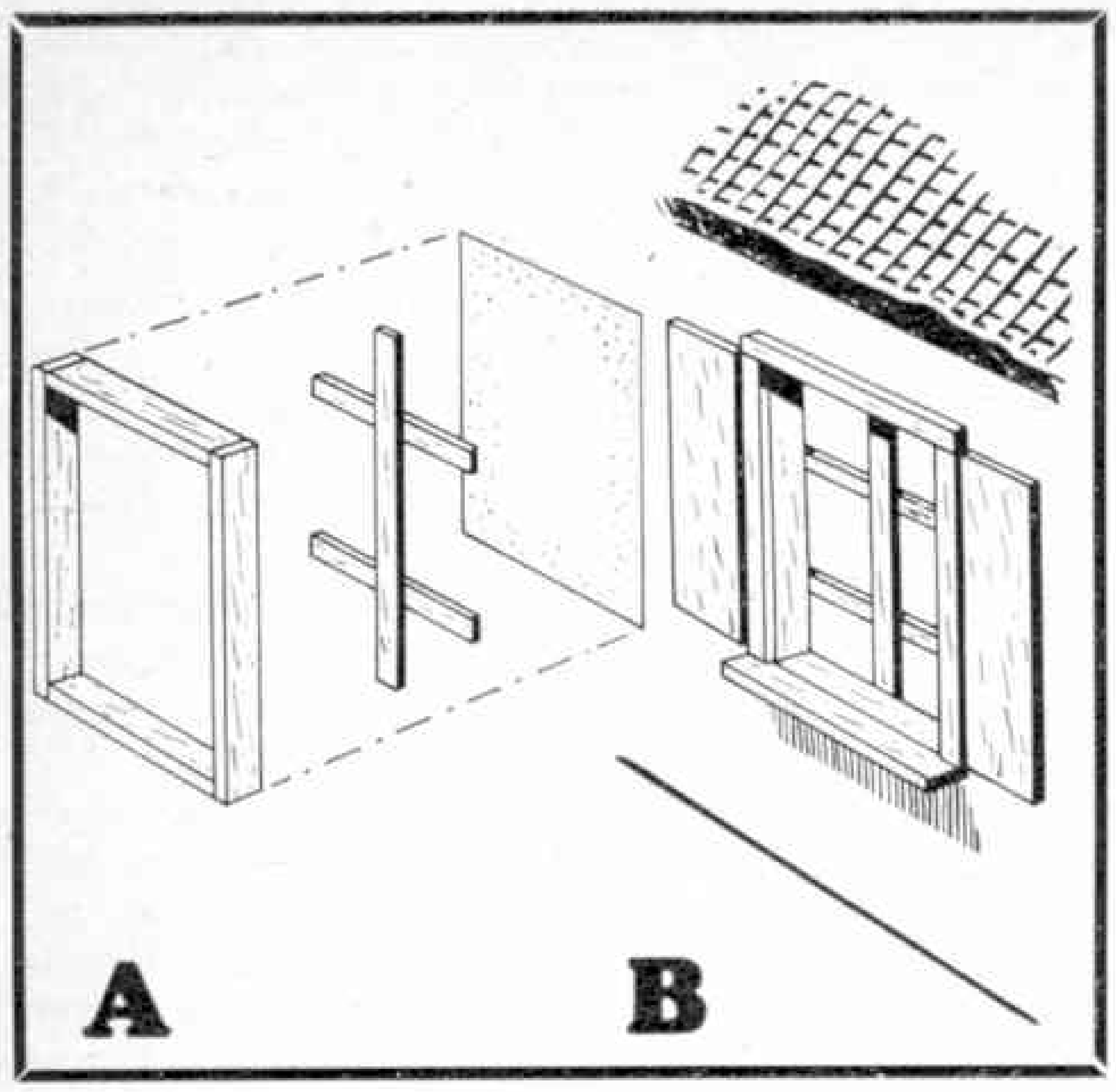
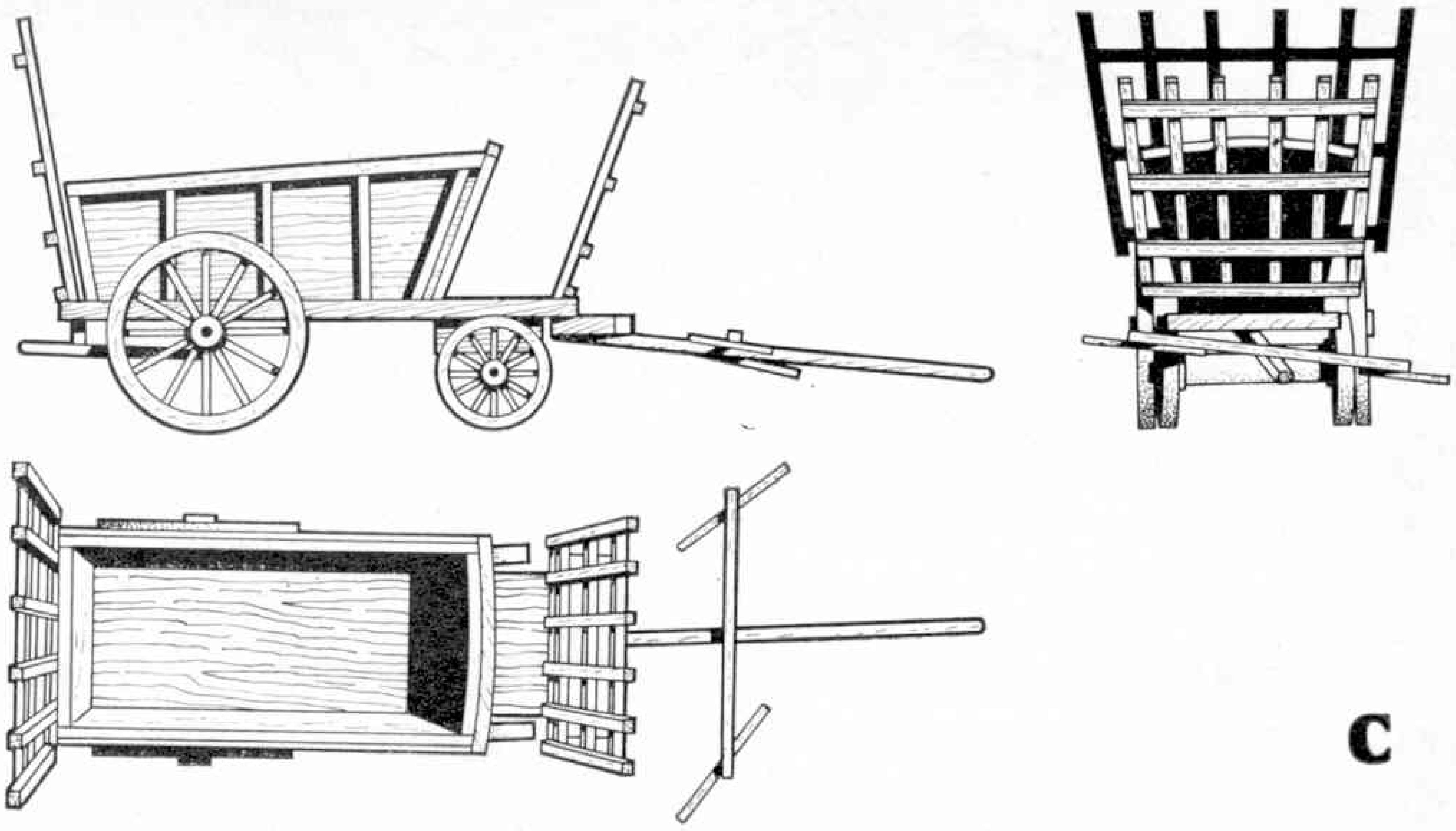


Building a model of a Royal Flying Corps Aerodrome





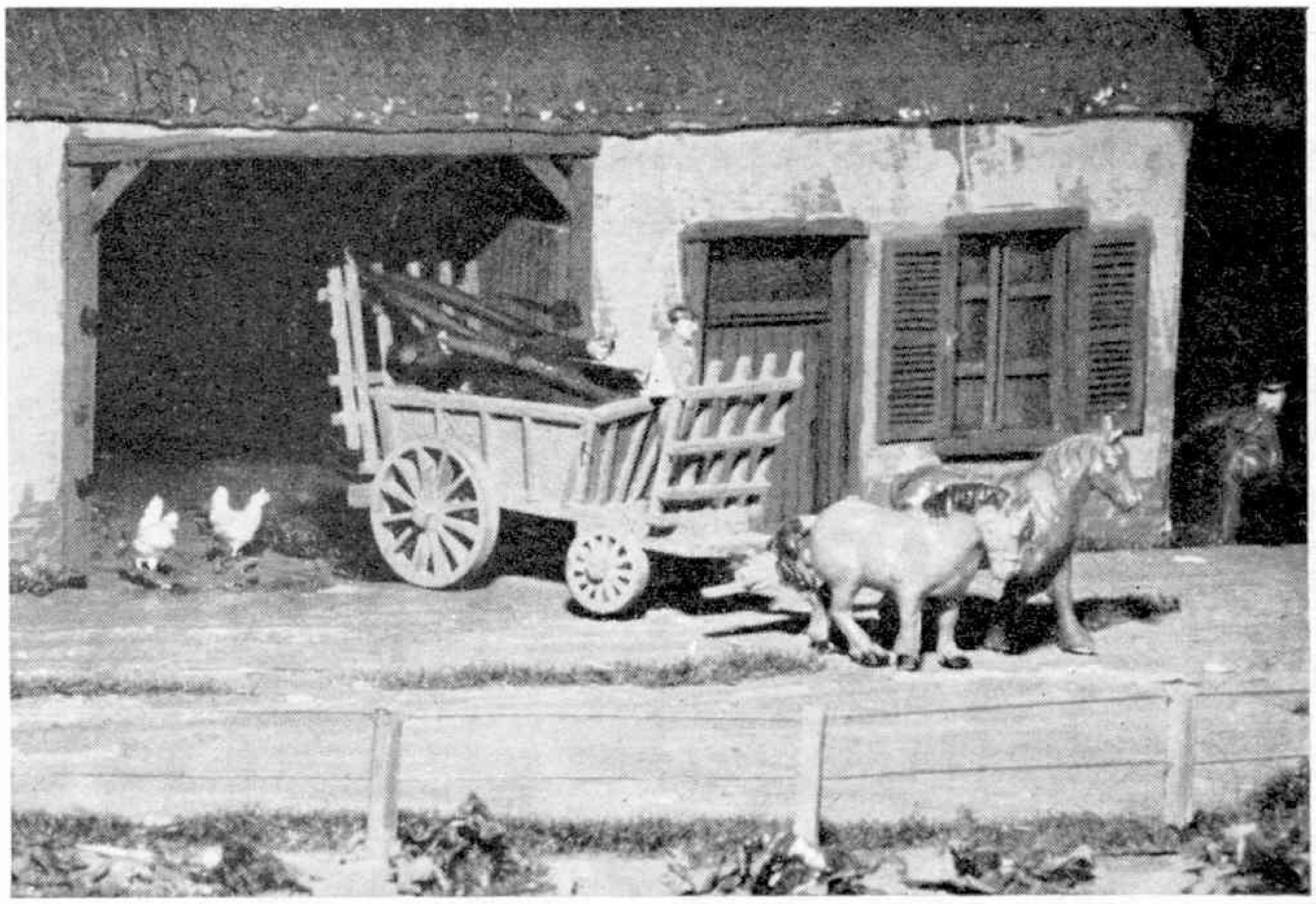
BEFORE describing how you can add one or two realistic items to your model aerodrome, here are some final details for the farm buildings described in our last issue. Figures A and B show how you can make realistic windows. As you will see from Figure A, the windows are recessed by constructing a rectangular frame from $\frac{1}{8}$ in. by $\frac{1}{32}$ in. balsa to which the window frames are glued. The windows are glazed with cellophane or tracing paper. The complete assembly is then fitted behind each window opening from inside the building. Outside frames, ledges and shutters are then glued in place as in Figure B. Doors, too, should be recessed by first making a frame of $\frac{1}{8}$ in. by $\frac{1}{32}$ in. balsa glued behind each doorway. All the woodwork of windows and doors can then be painted in a rather faded blue or green. Once these small additions have been made, the completed buildings can be fixed to their respective baseboards.

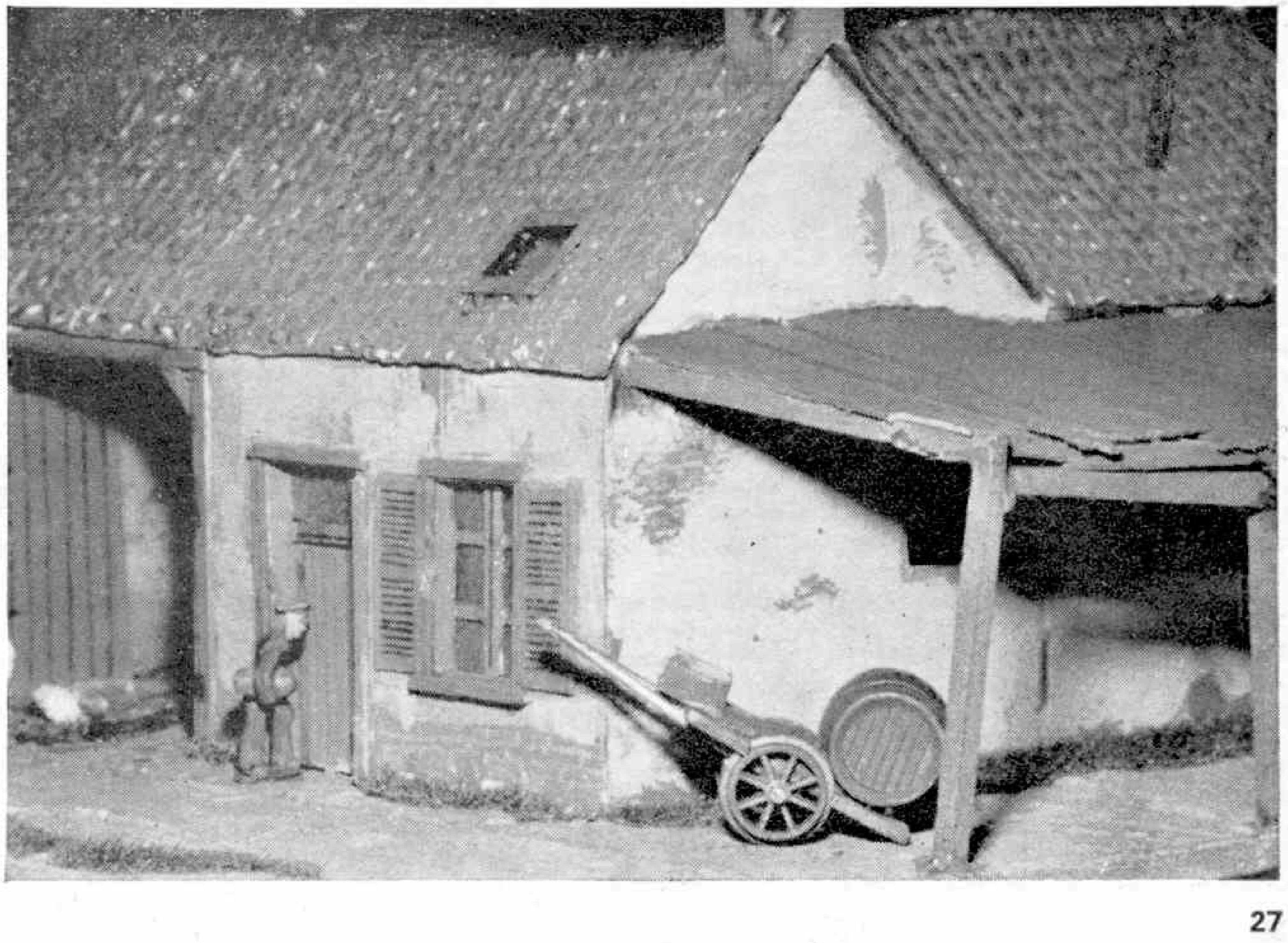
Figure C shows a typical French farm cart, a model of which can be easily constructed from $\frac{1}{16}$ in. and $\frac{1}{32}$ in. sheet balsa. The wheels are from the Airfix kit of Stephenson's 'Rocket', or you can use Slater's cart wheels if they are on sale in your local shop. If you use the ones from the Airfix kit they must be first modified by removing the flanges with a sharp knife and sandpaper. All four wheels came from the locomotive wheels in the kit. Small twigs or grass clippings in your farmcart will add a touch of realism. There is a wide range of farm animals to 1/72nd scale. Livestock in our model is from the Airfix and Merit ranges, although these do differ slightly in size. The water cart in Figure D is similarly constructed again making use of the Stephenson's 'Rocket' kit, the water barrel and two of the wheels from the tender in this case. Paint both carts in light brown, buff or green. Several carts, of course, can be made, depending on the size of your layout.

Trestles (Figure E) were essential equipment on every aerodrome, and two or three of these should be incorporated in your layout. They were employed to raise the aeroplanes into flying position in order that rigging angles could be checked. Ladders were also indispensable when mechanics were rigging the aeroplanes or filling the tanks with petrol. In the case of the D.H.2 the reserve petrol tank was above the upper wing and could not be reached from the ground. Both ladders and trestles are constructed from $\frac{1}{32}$ in. balsa strips and painted light brown or grey.

Ammunition boxes and petrol cans are simply cut from lengths of balsa to the dimensions in Figures F and G. Quite a number of each of these items can be made and either stacked neatly or scattered round the hangar. Paint the ammunition boxes green and the small petrol cans silver.

Personnel on the aerodrome can be modified from the large number of 1/72 scale figures on the market. Remember that the colour of the R.F.C. uniform was khaki. The blue uniform did not appear until the Royal Flying Corps and the Royal Naval Air Service were amalgamated as the Royal Air Force on April 1, 1918.





At the turn of a wheel with Ken Wootton

Cars, buses, trucks, vans, artics—even a roadsweeper—are included in the very 'mixed bag' of die-cast models which Ken Wootton describes this month. Some are quite rare, others not so rare, but all have a fascination of their own.

PROBABLY one of the oldest toy manufacturers in Great Britain, the Chad Valley Company, toy makers to the Queen Mother, today produce a large range of soft toys, metal toys and games, etc., but about 1947-48 they decided on an ancillary line to the above and, in 1949, the retailers up and down the country saw a comparatively small range of vehicles (mostly commercial) called 'Weekin' toys. This name is more than likely derived from the name 'Wrekin', which is an extinct volcano in Shropshire.

The first batch of toys were very crude compared with the Dinky Toys of the time—the double-decker bus illustrated bears this out. It doesn't appear to represent any particular brand of vehicle (though I'm going to try and rectify this feature before I repaint it!) and it's the same with the rest of this series.

Although most of them have passed through my hands at one time or another, their lack of authenticity is the reason why I can't show you any now, except the bus—but then I'm bus mad!

The models were entitled as follows: 'Razor edge saloon', this could have been a Rolls, Bentley, Armstrong, Triumph or practically anything, it's probably just a 'C.V.' special! Then there was a 'police car' and 'traffic control car' (these were merely the saloon, painted black with either a police sign on the roof for the cop car, or loudspeakers for the traffic control job). The trucks or lorries followed the Dinky procedure of producing a common chassis/cab/radiator casting for the whole lot with various rear ends and assorted boxes. These were as follows: open lorry (with sides), low loader, timber wagon, fire engine, cable layer, breakdown lorry, milk float, tower wagon, dustcart, and the double-decker bus, which is, of course, a different casting. There also *may* have been a cattle truck, petrol tanker and dump truck; got a feeling that I had the first two, but can't be sure.

The trucks—conveniently stamped '1949' on each number plate, looked vaguely like a Dodge of the period. They had clockwork motors, as fitted to all the Chad Valleys, with a large keyhole situated in the passenger door and were sold in assorted colours, though almost all the ones I saw had mid-green cab/chassis units. The wheels, as you can see, are of disc type, and were the same in size, etc., for the whole range. Tyres fitted *around* the wheel, rather than the Dinky fashion of fitting *into* the wheel. Last of the 'crude' types is a 'track racer', which is more than twice as big as the trucks and, therefore, to a much larger scale. It looks very much like the old pre-war Hotchkiss racing car, with enclosed cab and wheel housing and a streamlined tail with racing numerals each side.

Hot foot'n it after these and, in 1950, came a really pukka range, which was easily as good—and better than some of—the Dinkys of that period. Most of these are shown here and, because of short 'runs' on each tool or casting, they're all extremely rare now and, consequently, much sought after by collectors.

The cars consisted of a Humber Super-Snipe, a Humber Hawk, which differed but slightly from the Snipe which, as you see, is a beauty and fully captures the 'feel' of the thing. The other two were a Hillman Minx, which is ghastly, and a Sunbeam Talbot—very good but, for some unknown reason, produced in a larger scale—this puts me off somewhat as I do like the car section of my collection to generally 'fit in' together. Still, I'm not parting with it, for besides being a fine casting, it represents a type of Sunbeam not produced by any other manufacturer—I think!

As I say, this second wave were superior castings to the early trucks and I think this may be due to some sort of tie-up with Rootes, makers of Humber, Hillman, Sunbeam, etc., for on some of the base-plates these words are stamped.

Also, this later batch were finished in the correct company colours and not the usual bright eye catching or eye sickening colours used by our toy car manufacturers.

The only other vehicles I've seen by Chad Valley (and I'd be pleased to hear of anyone who has anything different—just for the record—or the collection!) were the vans in assorted colours with very nice Guy radiators and opening rear doors. I had a red one with 'Chad Valley Toys' on the side, which I swopped to make room for others and kept the 'Lyons' version you see here.

There was a Supertoy size super-detailed Commer Hands articulated lorry in red with 'Commer Hands' transfers on the sides and same type cab/bonnet unit as found on the old Dinky Commer breakdown lorry.

Then last, but definitely not least, the truly beautiful Commer Avenger coach, which is to a smaller scale and sits very well with the Dinky coaches, but has greater detail and finesse.

I've repainted mine cream and green because they were issued in a vile blue, at least all the six I had from various sources were. If you're a bus fan, this coach is a must for you and it's easier to come by than the cars, if you're gonna try hard enough by sending 'pleas in S.A.E.s' to as many collectors as you can find!

Well, that's the Chad Valley die-cast range in a nutshell. Not a big one by any means and one that didn't stay long, due probably to the fact that they were a little dearer than the current Dinkies which then had a monopoly (Lesney were only turning out a few large scale toys and Corgi weren't to appear for another six years).

In a way it's a pity because we might have seen some very interesting models as time progressed.

No use writing to Chad Valley either, they haven't even a spare tyre! So after wetting all appetites, I'll leave the proud possessors of Chad Valley Weekin Toys with a comforting thought (which is not so, I suppose, for those without 'em)—due to their short runs and short stay in the shops and Rootes dealer showrooms—prices are rocketing!

From those fabulous Chad Valleys, and as, I hope, an added fillip, I thought you'd like to see some 'odds and ends' from my commercial shelf.

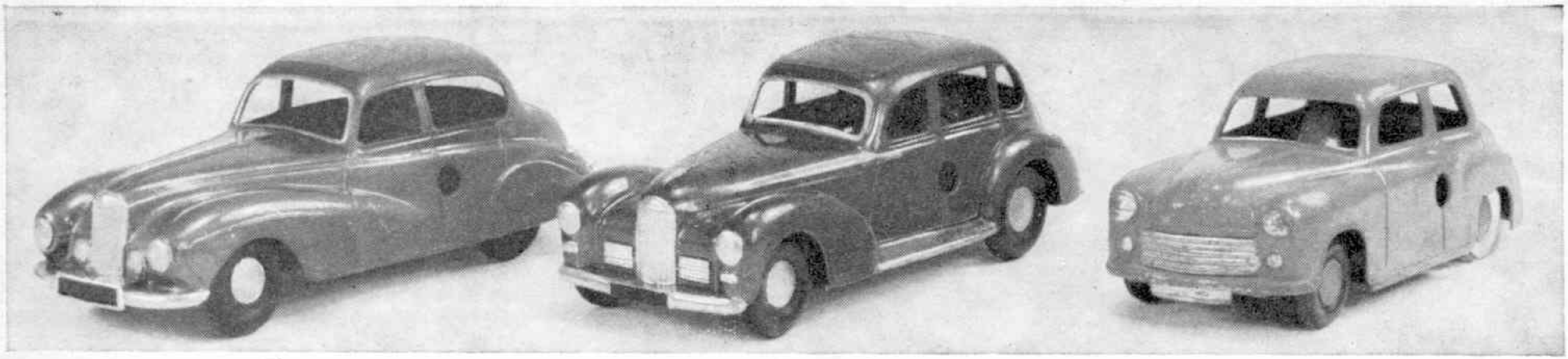
The Esso tanker No. 576 and the French railway delivery truck No. 584, are truly beautiful castings from the stable of Meccano in France. I really go a bundle on these and you will too, if you like commercials and manage to find these two. Both are articulated and the tanker is, of course, red. The 'S.N.C.F.'—Societe Nationale Des Chemins De Fer—is enamelled dark blue. They're both Panhards and are to the scale I love. (They're not huge Supertoys, but fit in well with Dinky's old scales of the 25 series and also, incidentally, with Märklin's great range which I hope to show you at a later date.)

The roadsweeper shown, bottom right, all by itself is the same model I found on my 'time travelling' in Cornwall—you know, my Christmas type carol! This, too, is a super model, simply crammed with detail and smelling 'vintage'. It *was* mechanical, with a huge keyhole, but I removed most of this, just leaving enough to fill the gap, and with the help of Plasticard and Loy's plastic metal I 'carried on' the beading and other body details which had been missing due to the said keyhole. When new, it was finished in a ghastly polychromatic blue (still mint), which didn't suit it at all, so I changed all that and painted it in dark green with black panels, picking out the letters and raised detail in gold. Manufacturers are Morris and Stone, who made the Morestone (later called Budgie) series. Personally, I can play for hours with this model and when you push it along the carpet or similar surface, it makes a most realistic sound, and you know, that brush sitting between the axles is for real—what more can you want?

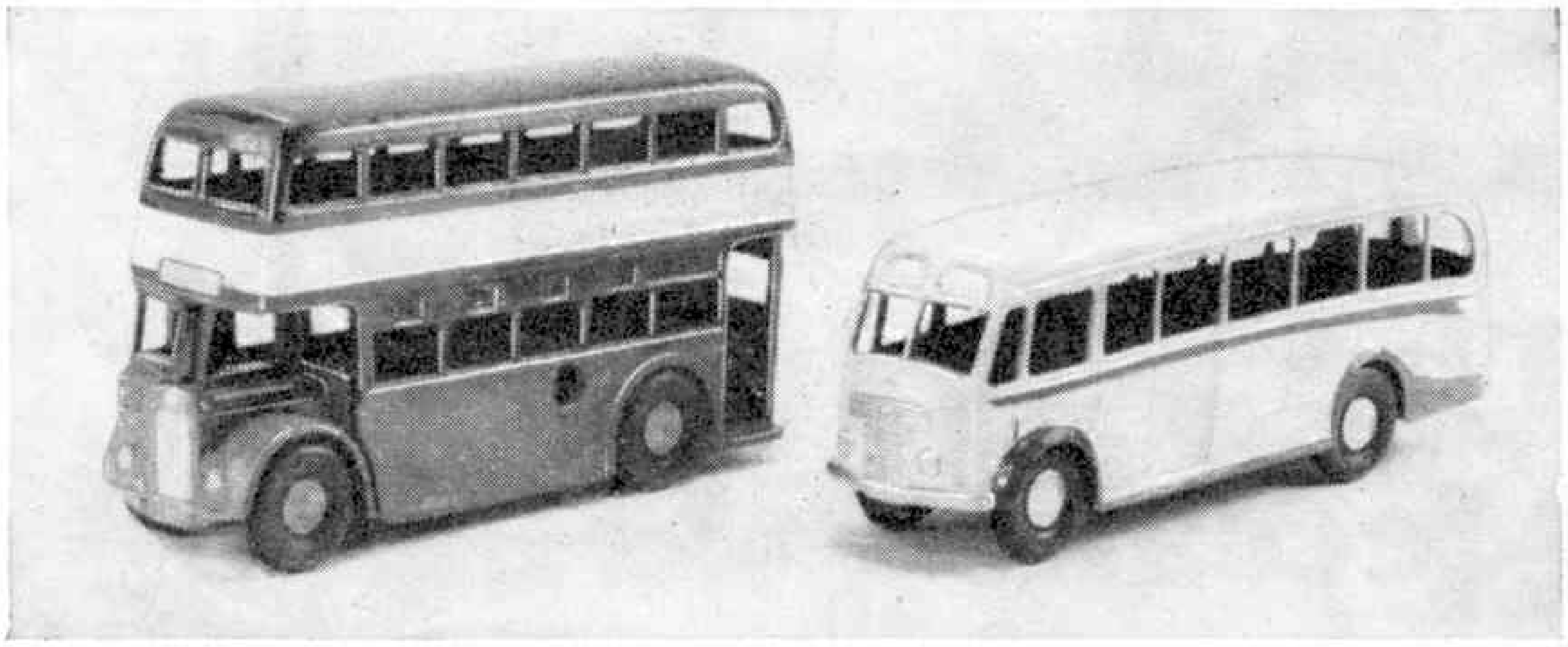
I should think it's pre-war, though it *was* bought as new in 1949. I have also the Morestone compressor truck which I've finished in the same colours. Anyone know what else made up the early Morestone range? If you do have any 'info', drop me a line, and if you want to sell or exchange—well, that's even better!

Whilst on the subject of Budgies, the three bottom models in the bottom left-hand picture are these. From left to right, a Bedford heavy in red and yellow, this, again, is a nice casting. The model in the middle is from Morestone's 'trucks of the world' series, and is a bulk liquid artic tanker in orange and cream. This series was great, but unfortunately, these, like Chad Valley, didn't last long. Maybe too much competition with the big boys at Meccano and Mettoy, etc. At the end, of course, is Budgie's No. 220 cattle truck in brown and beige—very nicely designed. The two models above these, are the early Corgi Commer Avengers, one with a flat bed body in yellow and silver, and the 'Walls' refrigerator van in blue and cream. I wonder why Corgi have stopped producing this scale stuff? I suppose the kids these days want everything *big*, and yet Lesney's King Size, which are to this scale (roughly), sell very well, don't they? I'd like to take a peek occasionally into the manufacturers' minds, perhaps we humble collectors could find a few answers that way.

The picture above the Corgis shows Dinky's B.R. articulated electric fork truck No. 30W in maroon, a Dinky army covered wagon No. 623, which I repainted cream, for the simple reason I liked the model, and yet again another Morestone. A Foden eight-wheeler. They did this as a flat truck, a flat with chains and a petrol tanker. Well, I'm running out of ink, so I'd better stop for this month. Drop me a line if you think you have some oddities which might interest us all. See you next month.



LYONS
ICE CREAM



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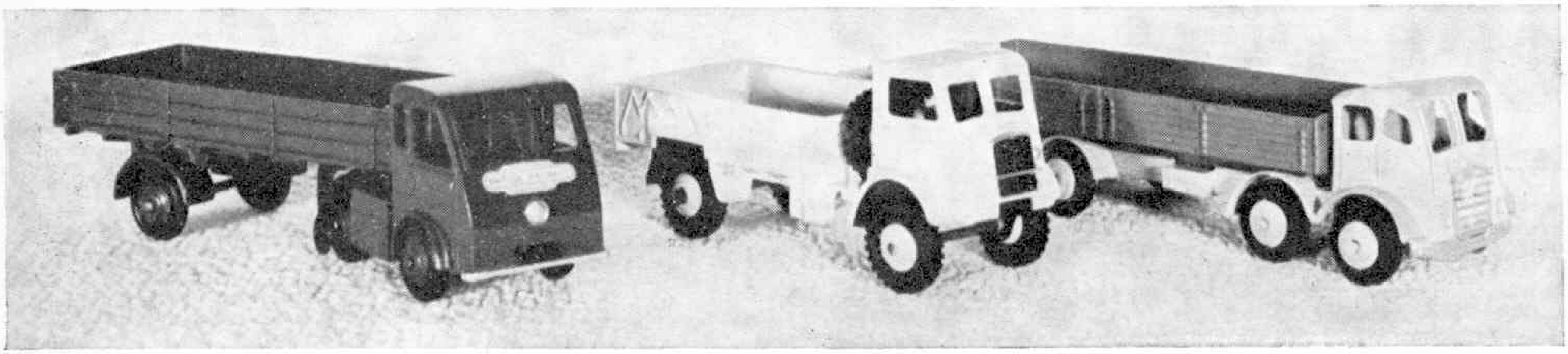
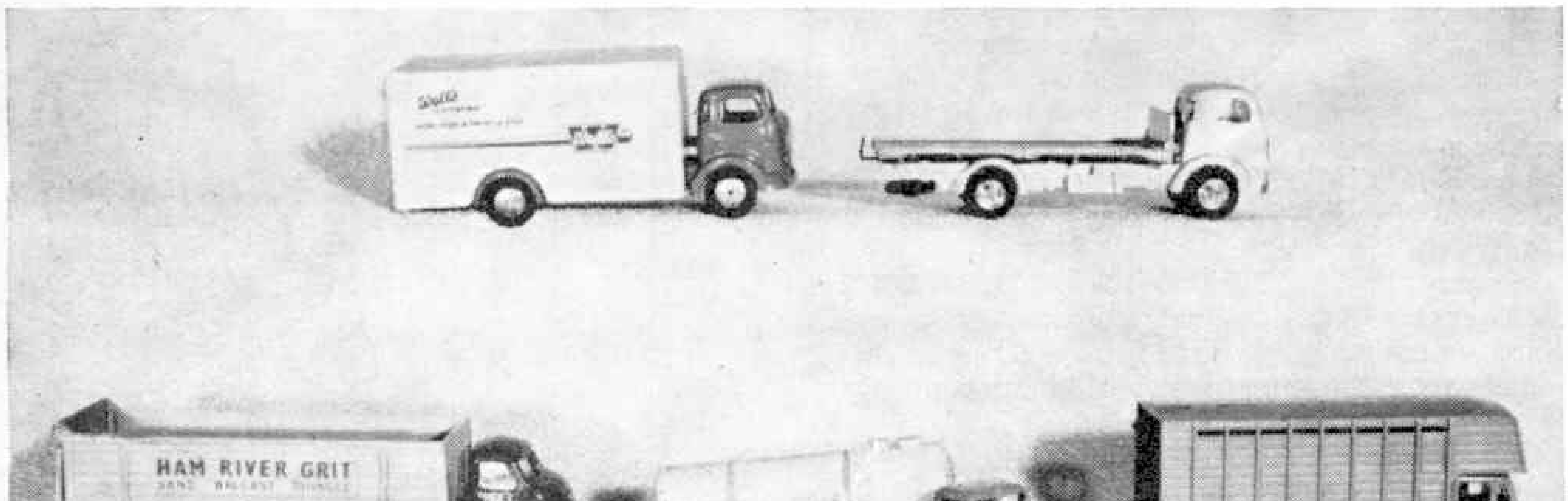
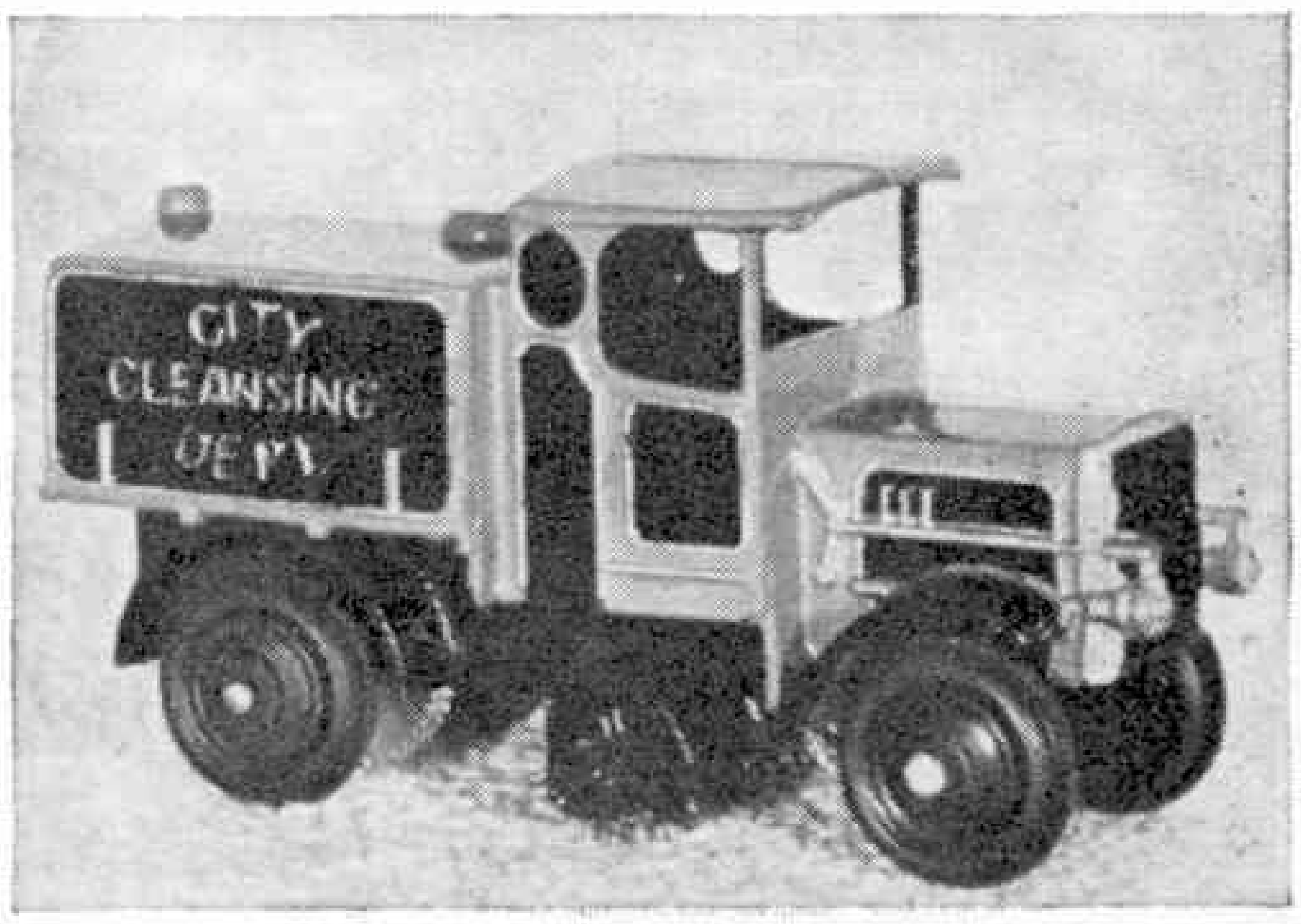



HAM RIVER GRIT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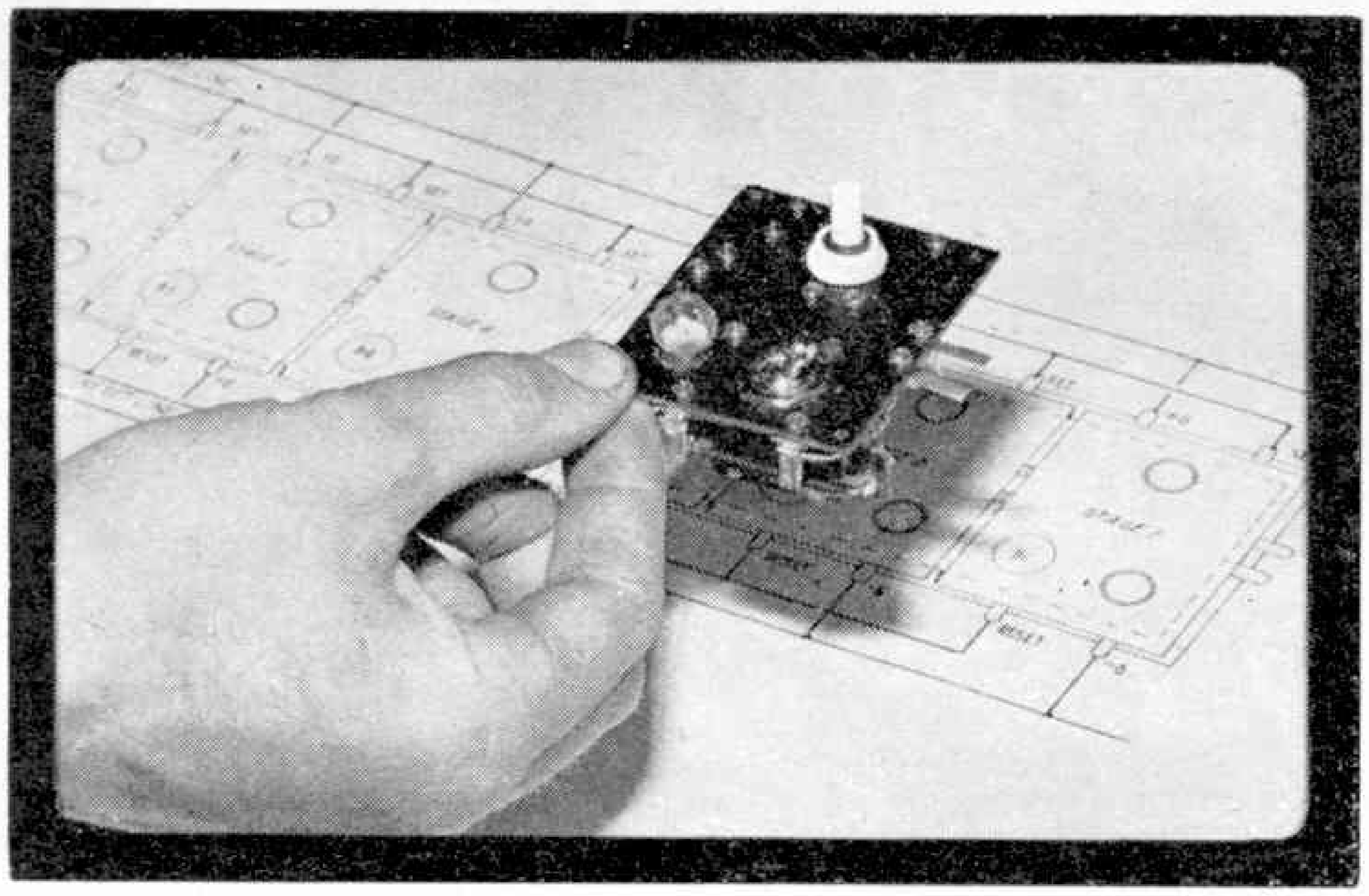

The Meccano Mag Computer

by

Ron Warring

This article describes the working of the binary system. Next month: how to improve the operation of your computer

THE decimal system which we normally use for counting, etc, has ten symbols of digits—0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. The *binary* system on which the computer works has just two—0 and 1. To work with real (i.e. decimal) numbers it is thus necessary to 'translate' decimal numbers into their equivalent binary numbers to feed into the computer. The computer will then give the answer in a binary number, which has to be translated back into a decimal number again.

This may seem a little complicated at first, but in fact it is quite straightforward. It has the advantage that by working directly with binary numbers the computer can be simplified and reduced to a minimum number of switching elements or stages. Each stage is then either 'off' (i.e. lamp extinguished), representing a '0'; or 'on' (i.e. lamp lit), representing a '1'.

Thus considering the first stage only, the two conditions which are possible are:—

(i) lamp off, representing binary 0=decimal number 0.

(ii) lamp on, representing binary number 1=decimal number 1.

This single stage thus has a total counting capacity of 1 in decimal numbers. Any larger number can only be passed forward to the next stage. Plotting this in the same order as the computer is laid out:—

No. of signal inputs (i.e. decimal number to be counted)	Second stage lamp	First stage lamp
0	0	0
1	0	1
2	1	0
3	1	1

The two stages together have a total (decimal number) count of 3; and again any larger number can only be passed forward to the next stage. Thus for three stages, and again starting from 0:—

No. of signal inputs (i.e. decimal number to be counted)	Third stage lamp	Second stage lamp	First stage lamp
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0
5	1	0	1
6	1	1	0
7	1	1	1

Thus three stages have a total count of (decimal number) 7 and to extend the count further we must add another stage; and so on. We can also see a pattern emerging of decimal numbers and their binary number equivalents, thus:—

Decimal number	Binary number
0	0
1	1
2	10
3	11
4	100
5	101
6	110
7	111

and so on.

We can also arrive at this in a slightly different way. Each stage is either 'off' or representing binary '0'; or 'on' representing binary '1'. The equivalent decimal number to the binary '1' is then dependent on the stage number, thus:—

For the first stage, '1'=1
second stage, '1'=2
third stage, '1'=4
and so on

This can be calculated on the basis that binary '1'=2^{N-1}, where N is the stage number. Thus for the fourth stage, binary 'I' would equal $2^{4-1}=2^3=8$; and so on. We can work this out for 10 stages as under:—

Stage No.	10	9	8	7	6	5	4	3	2	1
Decimal No. equivalent of binary '1'	512	256	128	64	32	16	8	4	2	1

To represent any decimal number as its equivalent binary number it has to be broken down so that it can be represented by the sum of binary equivalents. Thus, for example:—

(Decimal) 12=8+4
=1 from stage 4 and 1 from stage 3
=1100 (adding the condition of the second and first stages)

(Decimal) 13 would be=8+4+1
=1101 binary number
(Decimal) 14 would be=8+4+2
=1110 binary
(Decimal) 15 would be=8+4+2+1
=1111 binary
(Decimal) 16 would be=16
=10000 binary

From this you should be able to see how to set up any number, or read any number, on the binary computer. For example, to set up 16 you *could* apply 16 pulses to S W1 on stage 1 to reach the condition:—

stage 6	stage 5	stage 4	stage 3	stage 2	stage 1
off	on	off	off	off	off

equivalent to 010000 binary number. It would be much quicker, however, to operate SW1 on stage 5 *directly*, just once, to set up the same condition, and thus the same number.

Similarly, to translate a binary number indicated

BINARY NUMBERS FOR SIX-STAGE COMPUTER

Decimal Number	Binary No.					
	Stage 6	Stage 5	Stage 4	Stage 3	Stage 2	Stage 1
0	0	0	0	0	0	0
1	0	0	0	0	0	1
2	0	0	0	0	1	0
3	0	0	0	0	1	1
4	0	0	0	1	0	0
5	0	0	0	1	0	1
6	0	0	0	1	1	0
7	0	0	0	1	1	1
8	0	0	1	0	0	0
9	0	0	1	0	0	1
10	0	0	1	0	1	0
11	0	0	1	0	1	1
12	0	0	1	1	0	0
13	0	0	1	1	0	1
14	0	0	1	1	1	0
15	0	0	1	1	1	1
16	0	1	0	0	0	0
17	0	1	0	0	0	1
18	0	1	0	0	1	0
19	0	1	0	0	1	1
20	0	1	0	1	0	0
21	0	1	0	1	0	1
22	0	1	0	1	1	0
23	0	1	0	1	1	1
24	0	1	1	0	0	0
25	0	1	1	0	0	1
26	0	1	1	0	1	0
27	0	1	1	0	1	1
28	0	1	1	1	0	0
29	0	1	1	1	0	1
30	0	1	1	1	1	0
31	0	1	1	1	1	1
32	1	0	0	0	0	0
33	1	0	0	0	0	1
34	1	0	0	0	1	0
35	1	0	0	0	1	1
36	1	0	0	1	0	0
37	1	0	0	1	0	1
38	1	0	0	1	1	0
39	1	0	0	1	1	1
40	1	0	1	0	0	0
41	1	0	1	0	0	1
42	1	0	1	0	1	0
43	1	0	1	0	1	1
44	1	0	1	1	0	0
45	1	0	1	1	0	1
46	1	0	1	1	1	0
47	1	0	1	1	1	1
48	1	1	0	0	0	0
49	1	1	0	0	0	1
50	1	1	0	0	1	0
51	1	1	0	0	1	1
52	1	1	0	1	0	0
53	1	1	0	1	0	1
54	1	1	0	1	1	0
55	1	1	0	1	1	1
56	1	1	1	0	0	0
57	1	1	1	0	0	1
58	1	1	1	0	1	0
59	1	1	1	0	1	1
60	1	1	1	1	0	0
61	1	1	1	1	0	1
62	1	1	1	1	1	0
63	1	1	1	1	1	1

Example: 42=binary 101010
This number is set up on computer thus:—

Stage 6	Stage 5	Stage 4	Stage 3	Stage 2	Stage 1
press SW1	—	press SW1	—	press SW1	—

on the computer in terms of its decimal equivalent—read 'off' as '0' and 'on' as '1' and write down the binary number. Thus to read the following:—

stage 6	stage 5	stage 4	stage 3	stage 2	stage 1
on	off	off	on	on	off

write down the corresponding binary number—100110 from which follows the decimal equivalent
=32+4+2
=38

It can be a little tedious to have to work out equivalent binary numbers each time so we have included a table for direct conversion for a six stage computer. You can use these for entering a number on the computer; or translating a computer indication, for any number of stages up to six—but remember, the less the number of stages the lower the total count available. We can work this out directly from our knowledge of binary number equivalents.

No. of stages	Total count
1	1
2	1+2=3
3	1+2+4=7
4	1+2+4+8=15
5	1+2+4+8+16=31
6	1+2+4+8+16+32=63
7	1+2+4+8+16+32+64=127
8	1+2+4+8+16+32+64+128=255
9	1+2+4+8+16+32+64+128+256 =511
10	1+2+4+8+16+32+64+128+256 +512=1023

and so on

The process of translating ordinary (decimal) numbers into binary numbers is not complicated or difficult to understand. It is really very simple, especially if you use the table. All you have to remember is that the computer must be fed with binary numbers (the equivalents of the numbers you want to work with); and it will give its answer in a binary number which has to be translated back into an ordinary (decimal) number again.

Addition

Set all the SW2 switches to the 'add' position and operate the reset switch (SW3) to extinguish all lights.

Then set up the first number in the sum, in terms of its binary equivalent—i.e. operate the SW1 switch at all stages with a '1' in the equivalent binary number.

Add in the next number in a similar manner; and then any other numbers to complete the sum.

The computer will then indicate the answer as a binary number, which you then have to translate as an ordinary (decimal) number.

Let's follow this through with a simple example, adding 12, 4 and 7. First write down the binary number equivalents —using the Table:—

12=1100
4= 100
7= 111

	Stage 6	Stage 5	Stage 4	Stage 3	Stage 2	Stage 1
Set up 1100	—	—	Press SW1	Press SW1	—	—
Computer reads	0	0	1	1	0	0
Add in 100	—	—	—	Press SW1	—	—
Computer reads	0	1	0	0	0	0
Add in 111	—	—	—	Press SW1	Press SW1	Press SW1
Computer reads	0	1	0	1	1	1

Translate answer, binary 10111=16+4+2+1=23 or read from table, binary 10111=23

With practice this operation of adding in numbers can be done very rapidly. You could, of course, feed in 12+4+7 signal all into stage 1 without having to find the binary numbers initially and still get the same result, but this would take much longer. The answer would still be in a binary number and you would have to translate this back into an ordinary number.

Subtraction

To subtract numbers, all the SW2 switches are set to the subtract (—) position and the reset switch (SW3) operated to extinguish all lights.

Now operate SW1 on stage 1 which will make *all* the bulbs light up.

Set up the first number as before, operating the appropriate SW1 switches on the stages concerned to extinguish all unwanted lights.

Then use the appropriate set switches (SW1 switches) to subtract numbers.

Finally translate the answer back into an ordinary (decimal) number.

You will rapidly get the hang of this if you practice with simple numbers first, e.g. 4—2=2.

Multiplication

This is carried out by repetitive addition. Set all the SW2 switches to add (+) and add in the same (binary) number the number of times it is to be multiplied. For example, to multiply 6 by 7, work as an addition sum 6+6+6+6+6+6+6, but in binary number equivalent of course, i.e. 110.

Division

This is carried out by repetitive subtraction. Set all the SW2 switches to subtract (—) and operate switch SW1 on stage 1 and then set up the first number. Then see how many times the divisor can be subtracted from this number, until either zero is reached on the computer, or there is a smaller number remaining than the divisor. Remember you are working in binary numbers all the time.

Example: 11÷3.
Set up 11 and subtract 3, 8
subtract 3 again
subtract 3 again

There will now be 10 remaining on the computer (i.e. ordinary number 2, or less than 3).

The answer is then the number of times you have subtracted (3) plus the remainder (2/3).

In addition to stockists mentioned in earlier parts of this feature, the following companies can also supply computer components:—L.S.T. Components, 23 New Road, Brentwood, Essex. Brian J. Ayres & Co., 8 Hartfield Road, Wimbledon.

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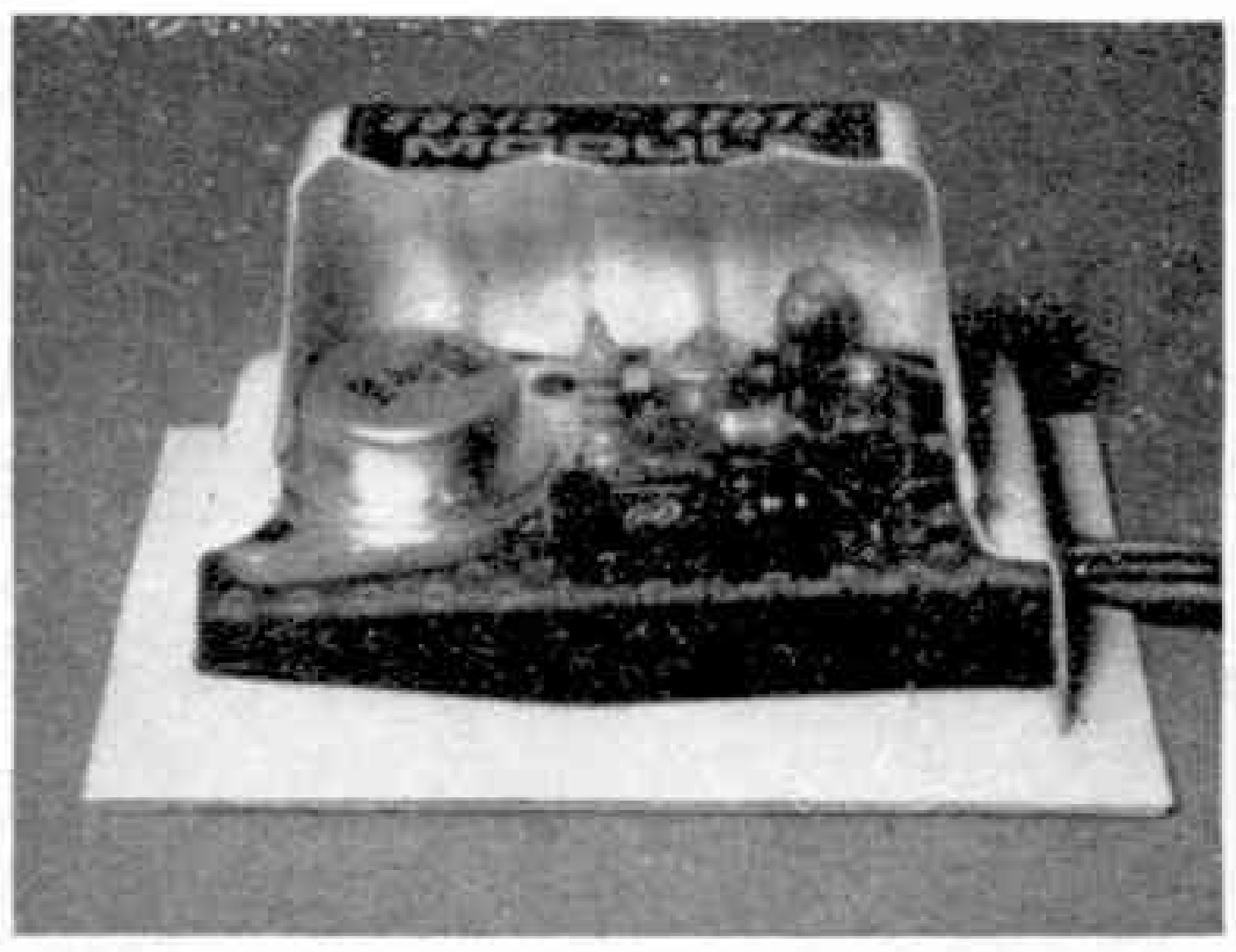

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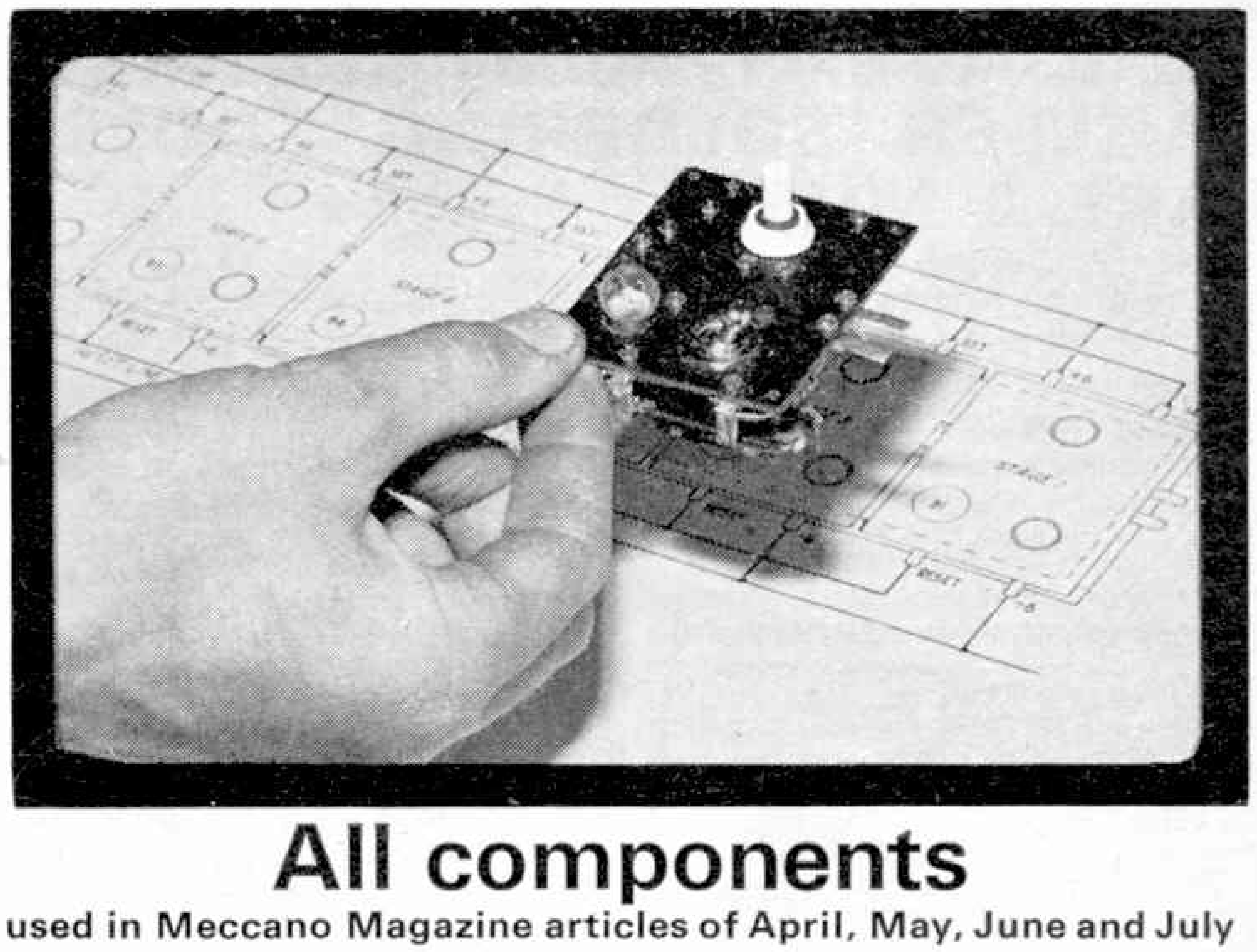

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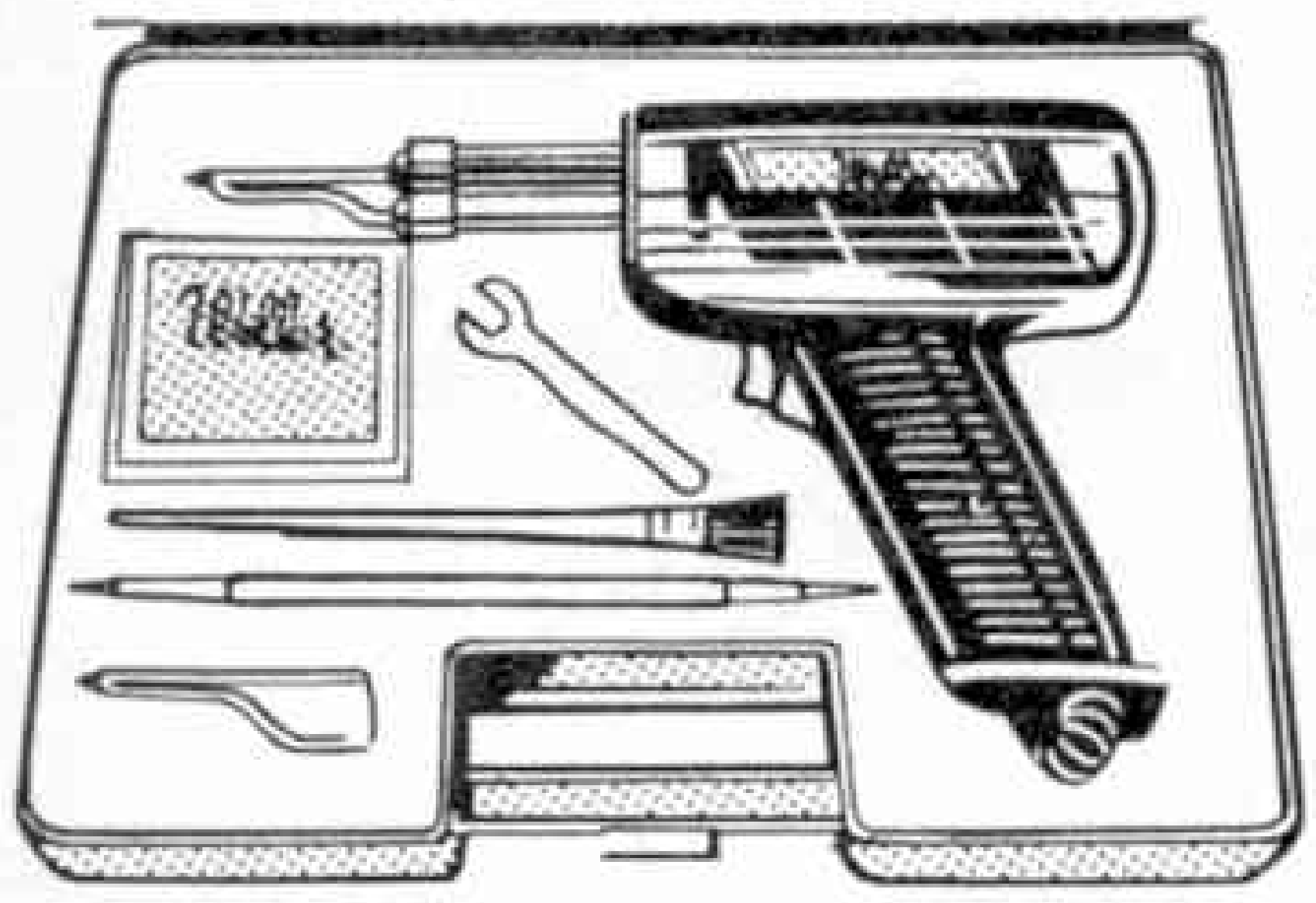

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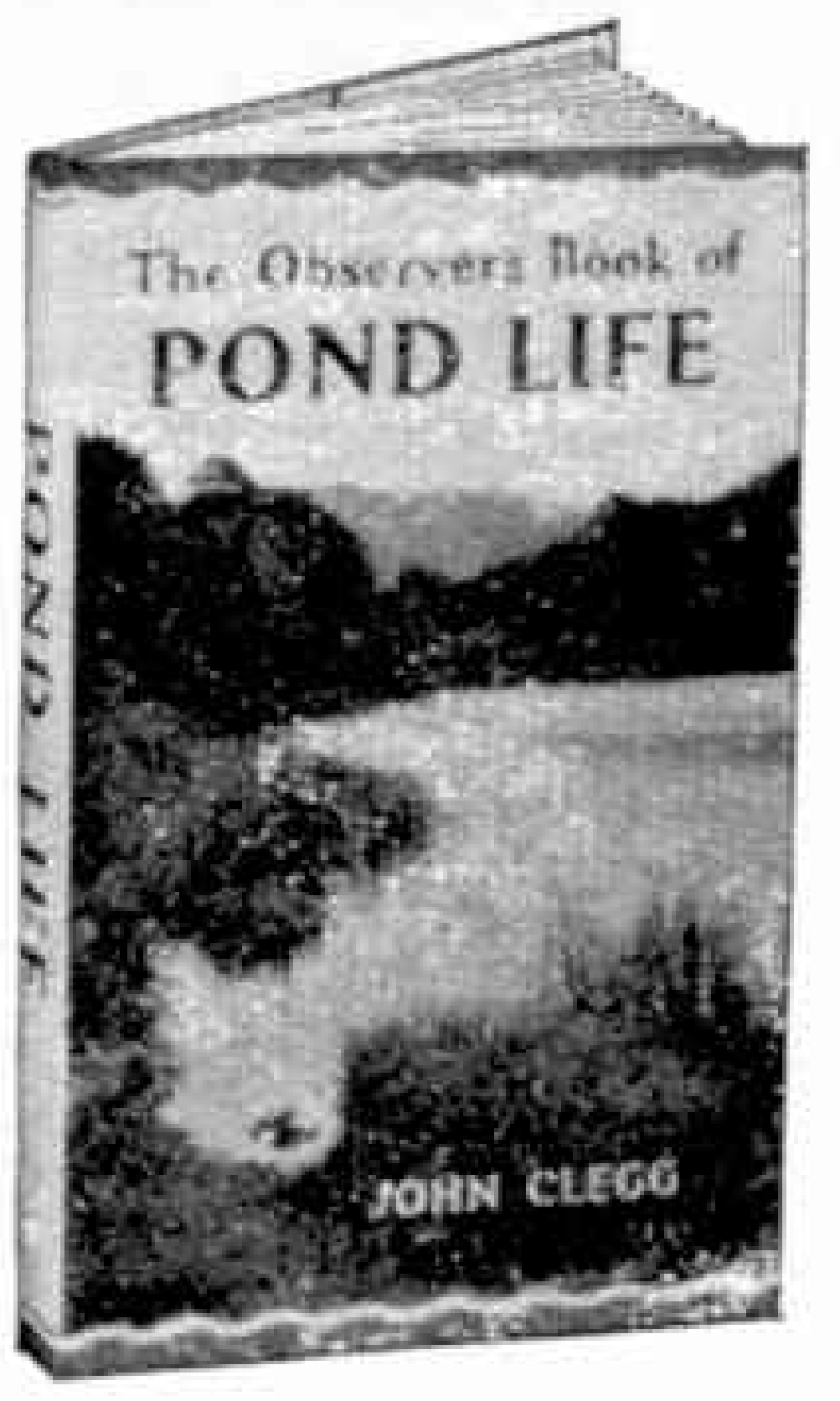

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POLITOYS PORSCHE 912 AND FERRARI 250 LE MANS

The Italian-made Politoys range of 1/43rd die-cast model cars hardly needs any introduction to hardened collectors, but some enthusiasts who are new to the 'die-cast' hobby have yet to see their first Politoy—what a pleasant surprise is in store for them! When reviewing models from the Politoys range, it is very difficult to avoid the usual rather insincere adjectives—'fabulous', 'fantastic', and all the rest, but the best word to describe the two models illustrated on this page is 'Perfect'. Sounds far-fetched? Just look at the beautiful little Porsche 912, finished in silver-grey with red interior trim. The body casting is so smooth and crisp that it even stands inspection through a magnifying glass; not a trace of flash or flow-marks anywhere, and the opening doors, bonnet and boot all fit perfectly. The window pillars are very slim (they can only be fractionally over exact-scale thickness) and the 'glass' fits snug and flush with the window frames. Inside, the seats are moulded in a semi-matt plastic, giving a realistic 'leather' effect. Every pleat in the upholstery is represented, and the rear squabs of the individual front seats fold forwards, allowing 1/43rd scale people access to the back seat! The boot lid, which is at the front of course, opens to reveal the spare wheel and a neatly stowed, integrally moulded suitcase. Under the opening rear 'bonnet' lid lurks a nice reproduction of the famous Porsche Volkswagen-inspired 'flat-four' engine. The car is sprung on all four wheels, and 'jewelled' headlamps complete the external effect.

Hairier still, the Politoys Ferrari 250 'Le Mans' is an excellent model of the famous Italian G.T. car, carrying Pinin Farina bodywork. The shape of the body, which is intriguing rather than beautiful, is a very difficult one to capture in a small-scale model, and must have presented quite a challenge to the Politoy craftsmen. However, not only have they succeeded in reproducing every complicated curve of this very complicated car, but they have thrown in several 'working' features for good measure; opening doors, bonnet, engine cover and roof hatch, detailed interior (including the gear lever!) 'V' engine with its impressive double row of carburetters, petrol filler-caps under opening hatches, 'see-through' spoked wheels and sprung suspension. The model is finished in metallic red with double white racing stripes, numbers and Italian licence plates. The interior is 'upholstered' in brown, and the engine and various small fittings are plated.

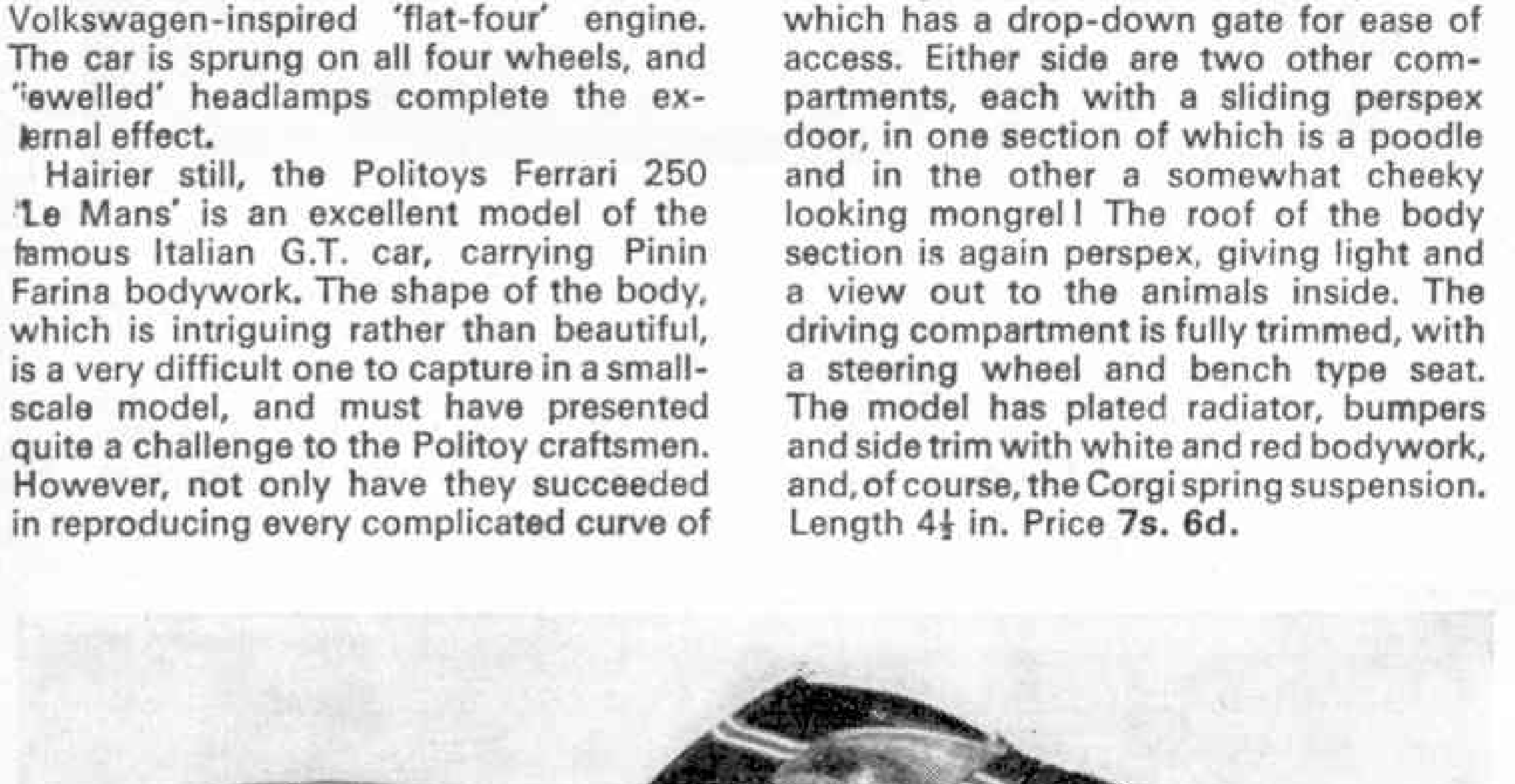
Quite apart from their obvious attraction as accurate scale models, these Politoys have a hidden advantage for the serious collector—they come apart! Undo a couple of countersunk screws in the baseplate, and the model is reduced to its component parts; everything either pushes together, or interlocks. This feature greatly aids repainting or modifying a model, and applies to *every* car in the Politoys range.

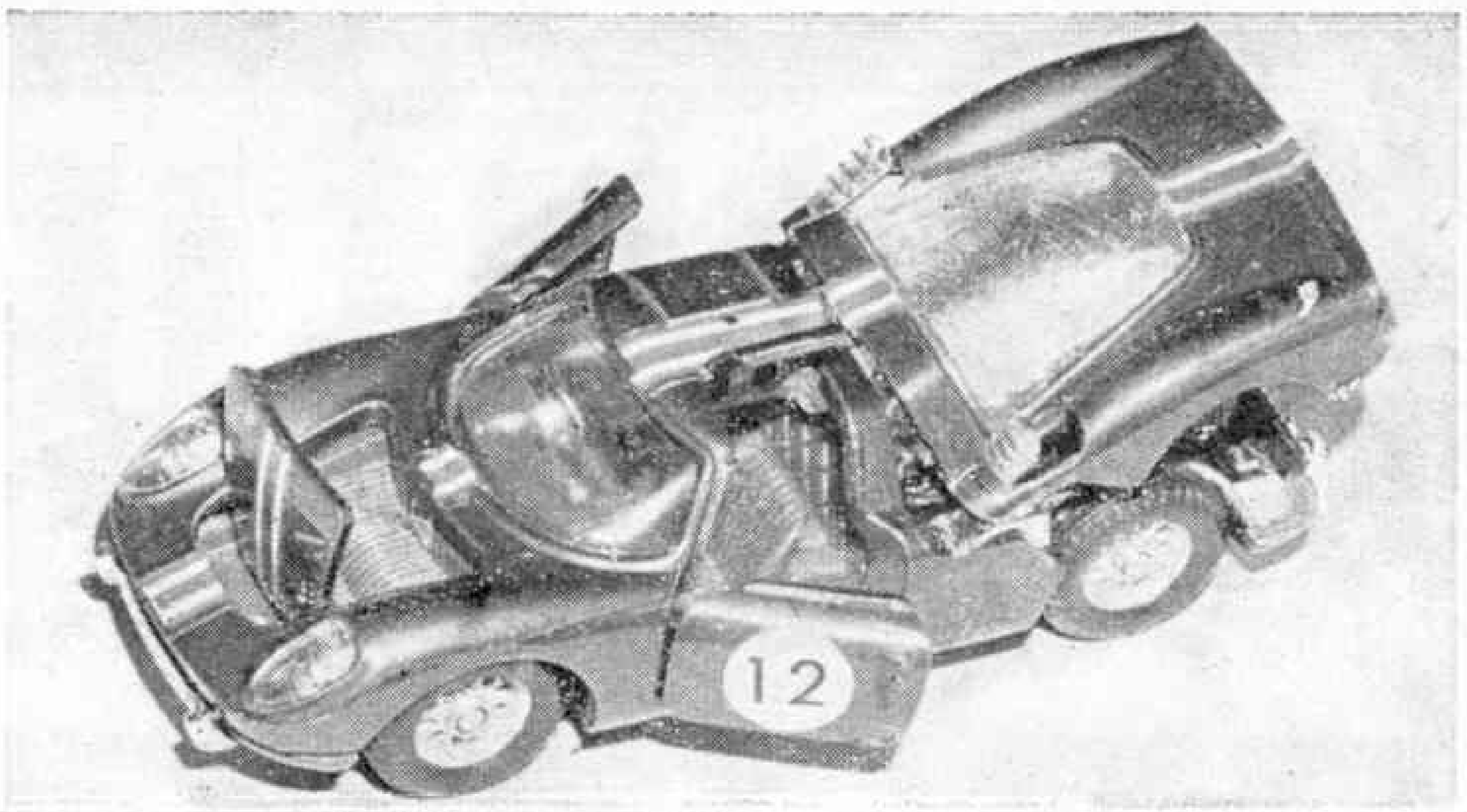
FRENCH DINKY TOYS CITROEN 2CV

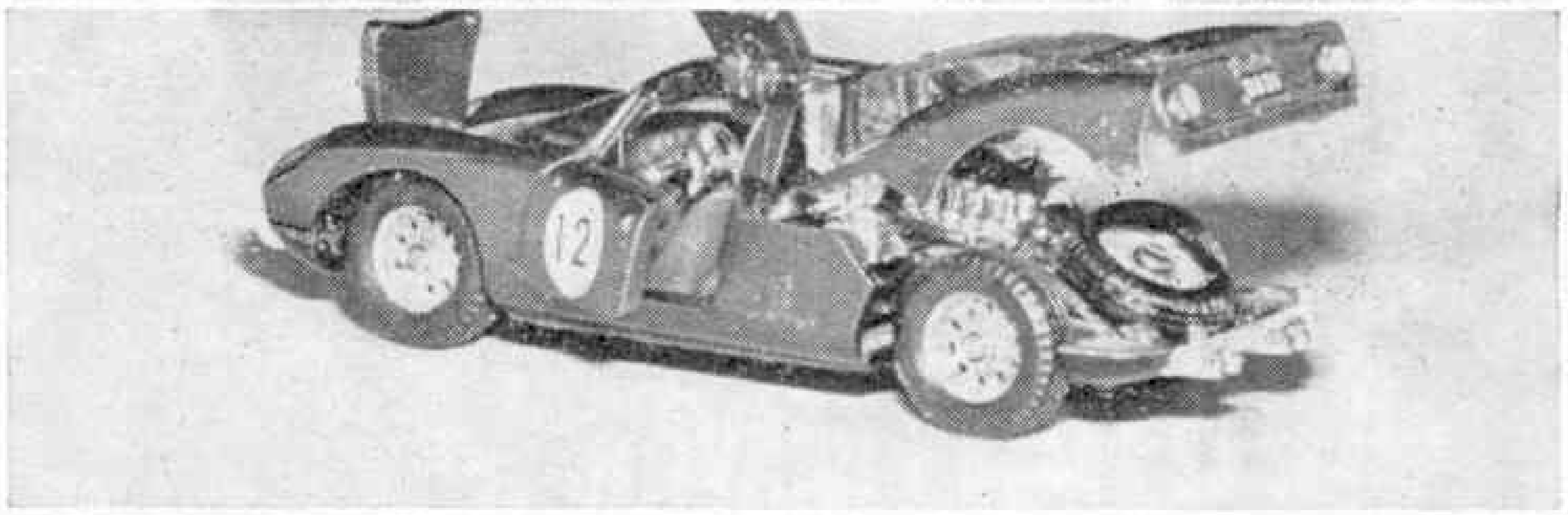
Readers who have visited the Continent will no doubt be familiar with the Citroen 2CV, that strangely amusing little car which appears to be the mainstay of private transport in Paris and other French cities. Despite its rather eccentric appearance, the 2CV has an interesting mechanical specification, including a two-cylinder air-cooled motor and extremely soft suspension by horizontal coil-springs. Our photo shows the latest French Dinky Toys version of the 2CV and a very pretty little model it is, too. Finished in a very French pastel blue, with its dark blue 'canvas' roof modelled in the open position, the very sight of the model conjures up a mental vision of scores of 2CV's dicing round the Place de la Concorde! The interior is complete with seats, door trim, dashboard and steering wheel, all these features being more than usually visible through the 'open' roof. The bonnet opens to reveal the engine, and the car is sprung on all four wheels in much the same bouncy way as its prototype. We can honestly say that we have never seen a model car that captures the 'atmosphere' of the real thing quite as well as this little Citroen does. Very French, and *tres jolie!*

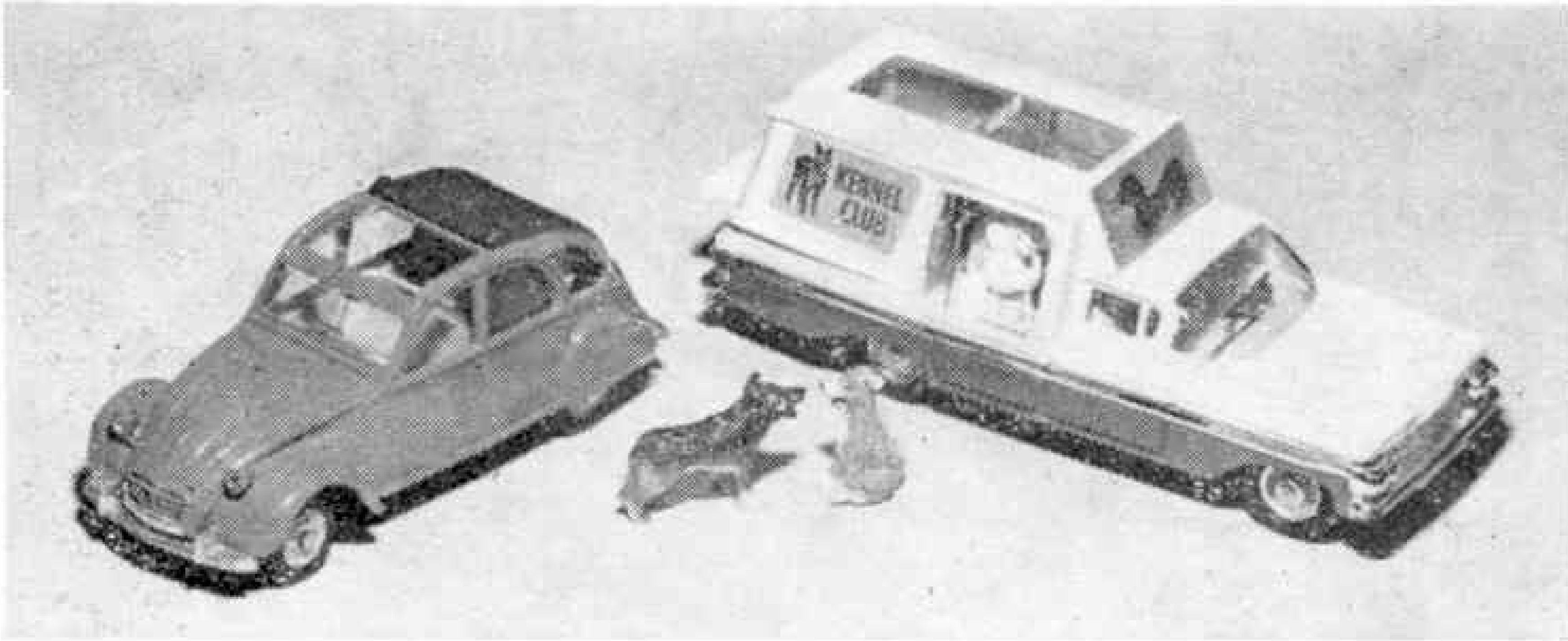
CORGI KENNEL CLUB SERVICE WAGON

The vehicle standing next to the Citroen in the picture is the new Corgi Kennel Club Service Wagon. Based on the Chevrolet Impala chassis, it has a most striking ultra-modern body. The front roof panel of the vehicle has an animated display of a daschund; the rear of the body is divided into three compartments with two dogs installed in the rear portion, which has a drop-down gate for ease of access. Either side are two other compartments, each with a sliding perspex door, in one section of which is a poodle and in the other a somewhat cheeky looking mongrel! The roof of the body section is again perspex, giving light and a view out to the animals inside. The driving compartment is fully trimmed, with a steering wheel and bench type seat. The model has plated radiator, bumpers and side trim with white and red bodywork, and, of course, the Corgi spring suspension. Length 4½ in. Price **7s. 6d.**









CLASSIC CAR PROFILES 25-60. PUBLISHED BY PROFILE PUBLICATIONS LTD., LEATHERHEAD, SURREY. Price **£4 4s 0d**

Profiles are now such a staple part of the reading 'diet' of car and aircraft enthusiasts, that one sometimes wonders what we ever did without them! For modellers and restorers alike, the individual car Profiles provide a feast of reliable factual 'gen' combined with really superb photographs, many published for the first time, and the beautiful coloured plates do much to convey the appearance of the cars that were made in the days when cars were cars and motoring a pleasure.

The latest bound volume of Profiles comprises Nos. 25-60 inclusive, and no-one could wish for a more varied collection of interesting machinery than that which is found between its attractive cream and blue covers. What a contrast between the Austin Seven and the AC Cobra, the 3 litre Bentley and the Morris Eight, the Jaguar C type and the MG Midget! In these contrasts between the historic and the up-to-date, the rich man's motor and the family 'runabout', the powerful and the puny, lies the true value and appeal of Profiles. The pride and prejudice which has hampered the 'Old Car' hobby for so many years is nowhere to be found in this book.

Each of the Profiles in this volume is 'written up' by an author who is an expert in his particular field. This is another advantage of the Profile 'system', and of course, ensures authenticity. The Daimler Double-Sixes are described by William Boddy, the 4½ litre Lagondas by George A. Oliver, the Stanley Steam Cars by Anthony Bird and the Morris Eights by Michael Sedgwick, to name just a few well-known experts. All the colour plates are excellent, and are the work of several different artists. We particularly liked Keith Broomfield's plate of the 1929 Lancia Lambda, finished in a delicate shade of lilac—beautiful! Some of the cars featured in the Profiles will probably be completely unknown to MM readers—the OM, the Cord, the Duesenberg—but the combination of lively and readable text and profuse illustrations cannot fail to bring these wonderful vehicles to life again. Young readers will probably be surprised at just how 'with it' some of these supposedly 'old-fashioned' cars were—the Cord, for instance, sported disappearing headlights a quarter of a century before they appeared on a British sports car!

So there it is, a magnificent cavalcade of motoring history combined in one book which is factual enough to be used for reference, and at the same time, readable enough to be taken up and put down like a novel. We highly recommend it to everyone with an interest in motor cars.

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This is an Atlas with a difference! In fact, it is unique. It is the first Atlas ever produced to use shadow relief maps throughout. Three dimensional models of every area of the earth have been photographed specially, and the results form the basis for the maps in this Atlas. This process, in fact, ensures that each map gives a true and easily understood picture of the terrain it represents, and because the models themselves have been prepared from very up-to-date information, it also ensures complete accuracy. Broadly speaking, the Atlas comprises twelve maps of the continents and oceans of the world, fourteen maps of the major divisions of each continent, six political maps of the continents and thirty-four large scale maps of the more important countries, regions or spheres of interest. There are also twenty-four historical maps and thirty-six maps devoted to details of climate, plus a special set of maps for each continent which give economic information on soils, land use, power resources, population density and religions. An absolute mine of information, very attractively produced, and indispensable to students or those interested in world geography.

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A ship's radio beams out the international distress signal 'Mayday' and immediately all nearby ships alter course and race to her aid. A fire alarm is triggered at a blazing timber yard and fire engines speed to the scene. A 'phone call about fallen crates on the M1 brings emergency services leaping into action. These are just a few of the moments when electronics come to the rescue in modern life.

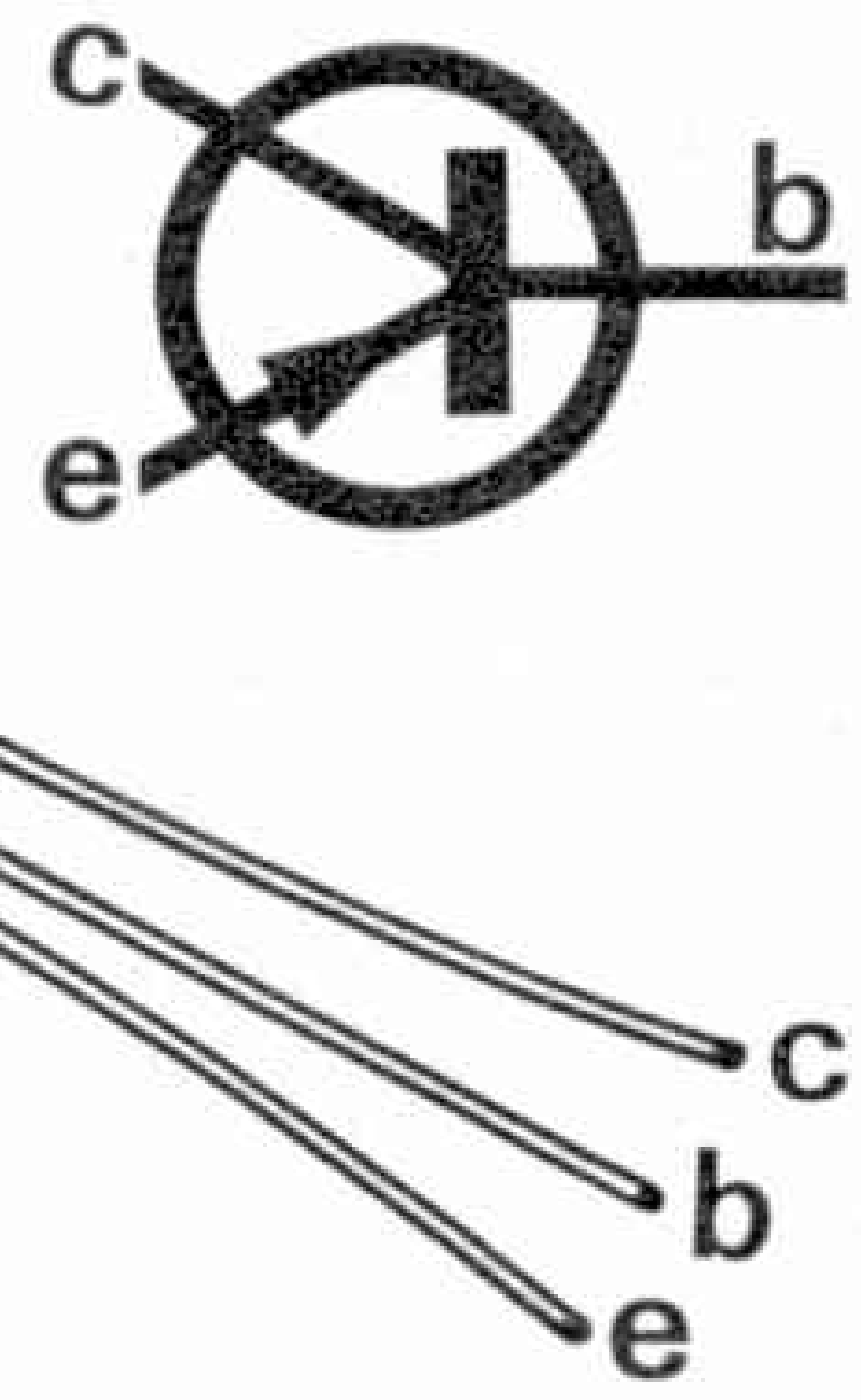
Radios are electronic devices. So are telephones, many fire alarms, even police sirens. Radar, another electronic device, is often used to help ships steer clear of navigational hazards at night or in fog. Hospitals use all kinds of highly specialised electronic aids. And so the list goes on. Every year, electronics save hundreds of thousands of lives, all round the world.

Electronics baffle most people, but you'd be surprised how quickly you can learn a few basic principles.

Take an amplifier, for instance. This is a device that will take a tiny electrical signal such as that picked up from a radio aerial and multiply it perhaps several million times until powerful enough to drive big loudspeakers. Learn how to build an amplifier and you have the key to all sorts of ingenious electronic devices.

Engineer News

Diagram 1. Typical Transistor supplied with Philips Young Engineer Kit.



How a transistor amplifies current

A transistor usually looks like a little metal tube, with 3 or 4 wires coming out of one end. The tube protects the real transistor, often made of a rare and expensive substance called germanium. To understand how a transistor works, you must first know what an electric current is.

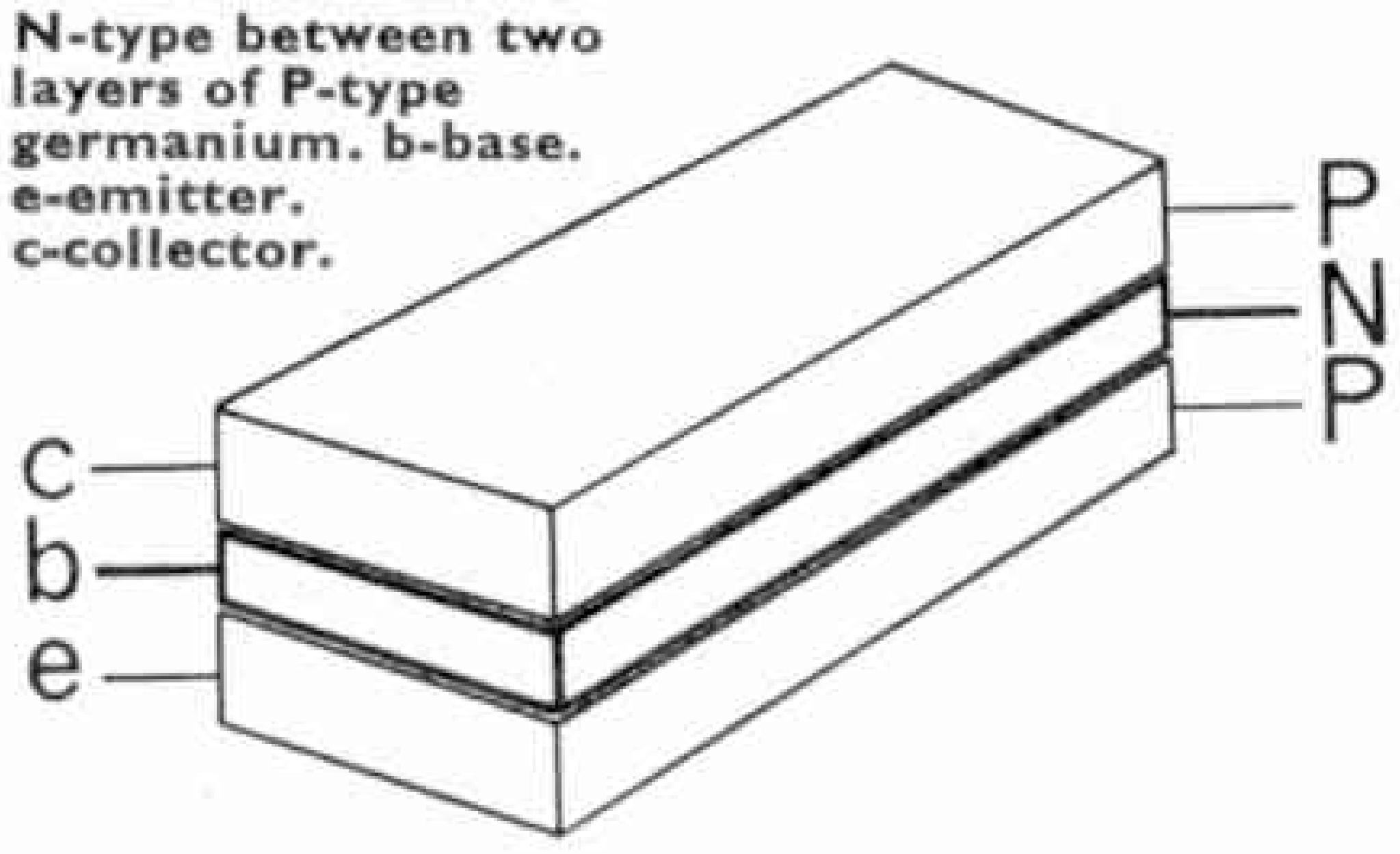
All matter is made up of atoms. Each atom has a nucleus with one or more electrons revolving around it. A nucleus has a positive electric charge and an electron a negative one.

If an electron moves out of an atom, it leaves a 'hole' which tries to get hold of an electron from the atom next door. With some substances, electrons can be made to flow from atom to atom in one direction. Such a flow is called an electric current.

If electrons flow readily through a substance, it is called a conductor. If they don't, it is called an insulator. Germanium falls between these two extremes and is called a semiconductor.

Adding arsenic to germanium creates a surplus of free electrons. This is called N-type germanium. Adding indium creates a surplus of 'holes' that go looking for electrons from next-door atoms. This is called P-type germanium.

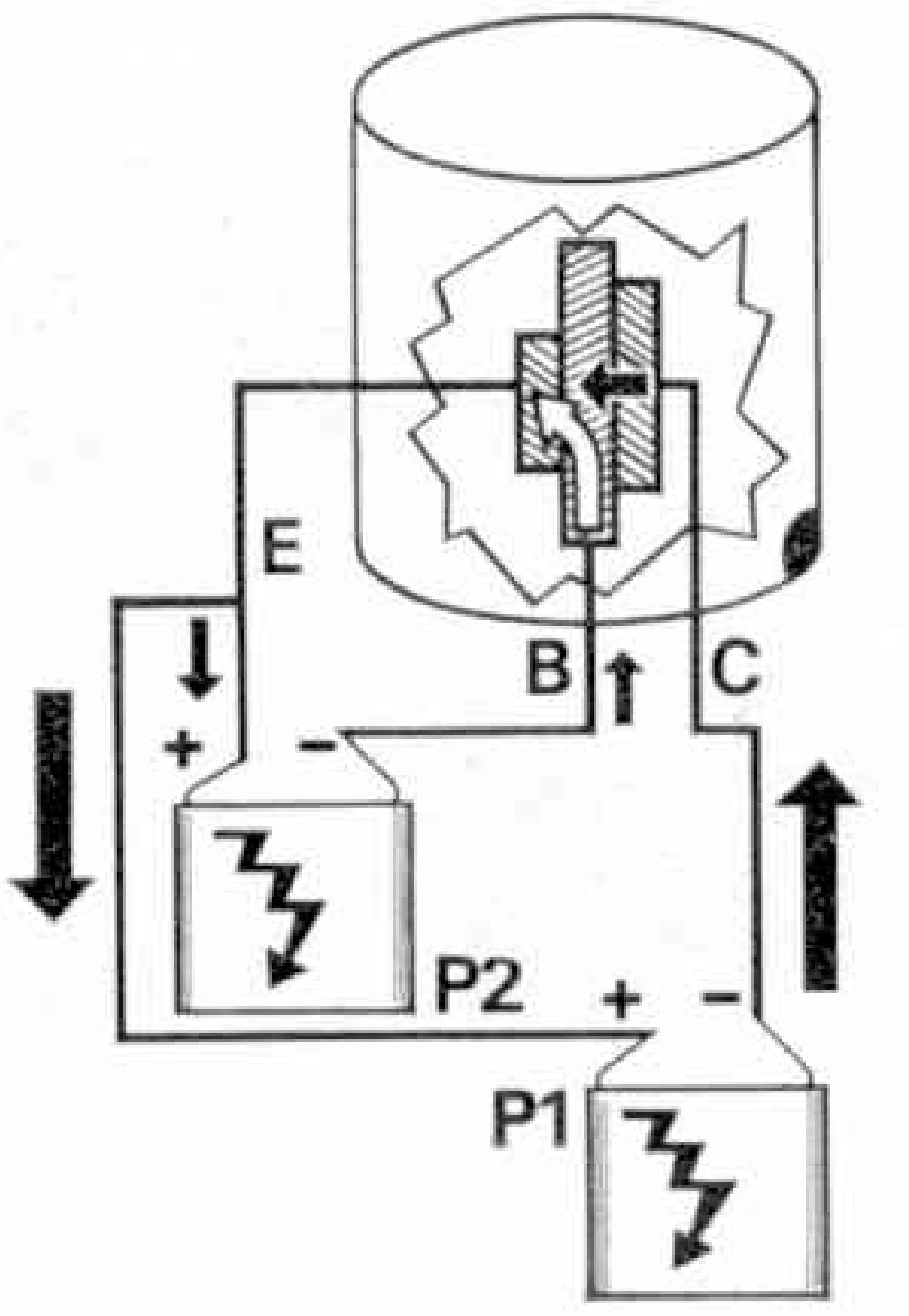
Diagram 2. Transistor 'sandwich' of N-type between two layers of P-type germanium. b-base. e-emitter. c-collector.



The transistor illustrated has a layer of N-type (with lots of electrons) sandwiched between two layers of P-type (with lots of holes). The middle layer is called the base. The outer layers are known as the emitter and the collector respectively.

When batteries are connected as in diagram 3, electricity flows readily through the transistor.

Diagram 3. Showing how power sources are connected to a transistor in a 'common emitter' Amplifier circuit.



Battery P2, connected between base and emitter, produces the *input* current.

Battery P1 tries to pump 'holes' from emitter, through base, to collector. The current from the collector is called the *output*.

The base acts as a control or 'throttle' on the number of 'holes' it lets through to the collector. The higher the input, the higher the output.

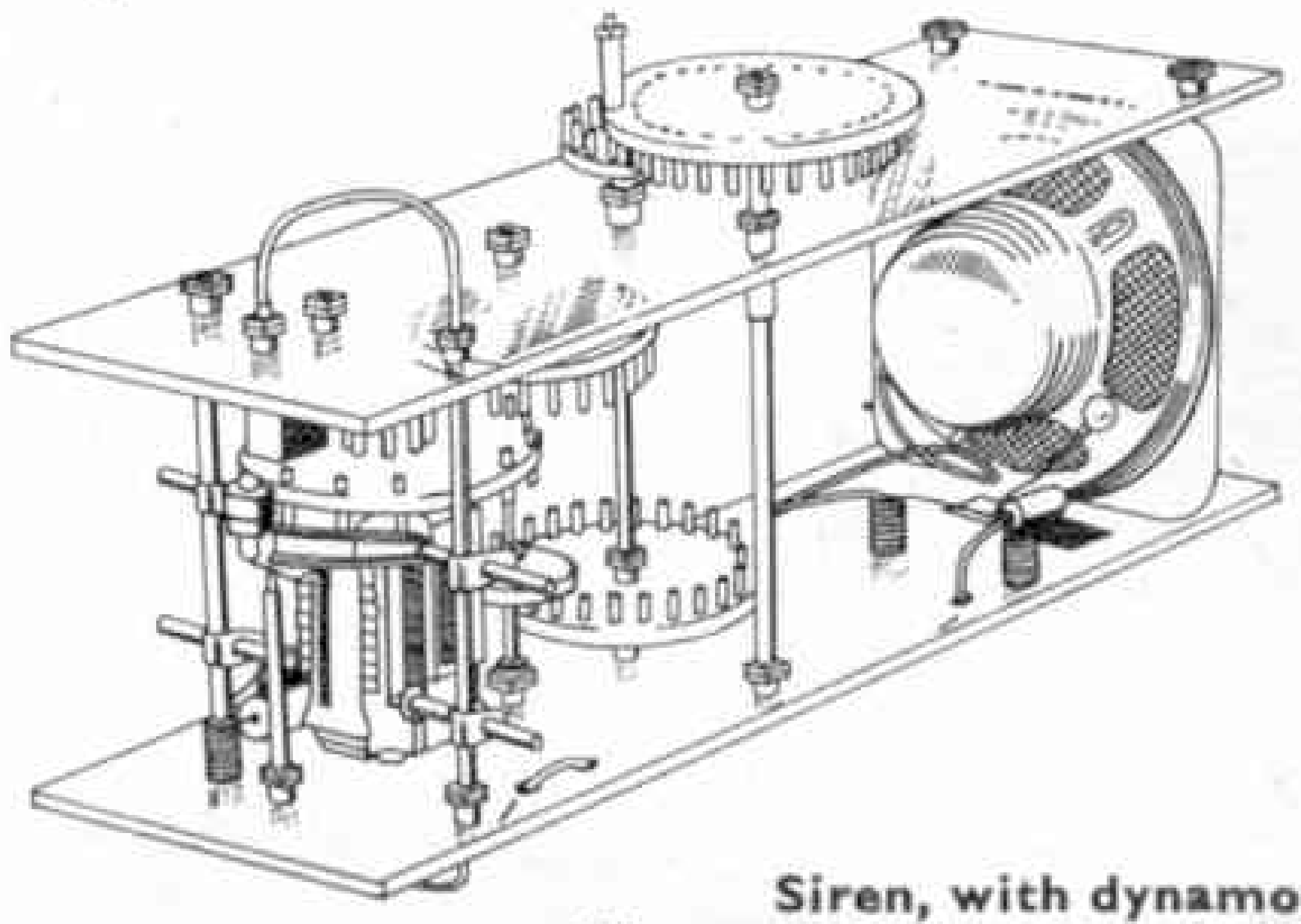
The first important thing to note is that the output from the collector is many times more powerful than the input at the base.

What's more, a very *tiny change* in the input current produces a very *large* change in the output current. So if also we feed a tiny, changing, signal from, say, an aerial, into the base, very *large* changes will be produced in the current from the collector.

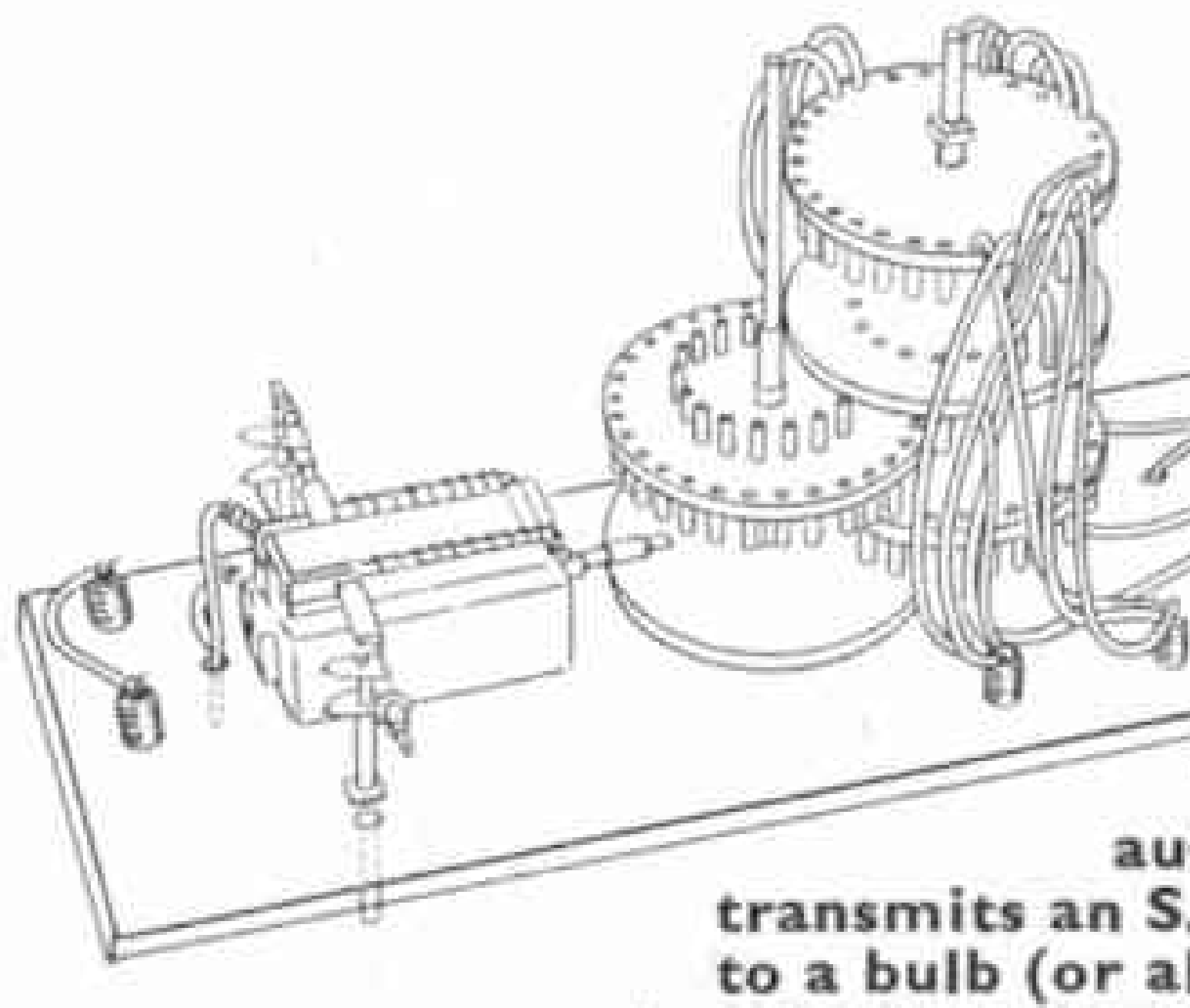
Several transistors can be linked in a circuit to amplify the signals until they are strong enough to drive a loudspeaker.

Such a circuit, involving the use of one or more transistors, is what makes a modern amplifier, which can be used to feed many things other than a loudspeaker.

Transistors like those used in sirens, radios and computors are in Philips Electronic, Radio and Interphone Engineer Kits. These kits enable you to build all sorts of ingenious devices *and* find out exactly how they work.



Siren, with dynamo, amplifier and loudspeaker, built from components in Philips Young Engineer Kits.



This device automatically transmits an S.O.S. signal to a bulb (or alternatively to a loudspeaker). Built with components from Philips Young Engineer Kits.

Look out for the next fascinating article in this series about electro-magnetics

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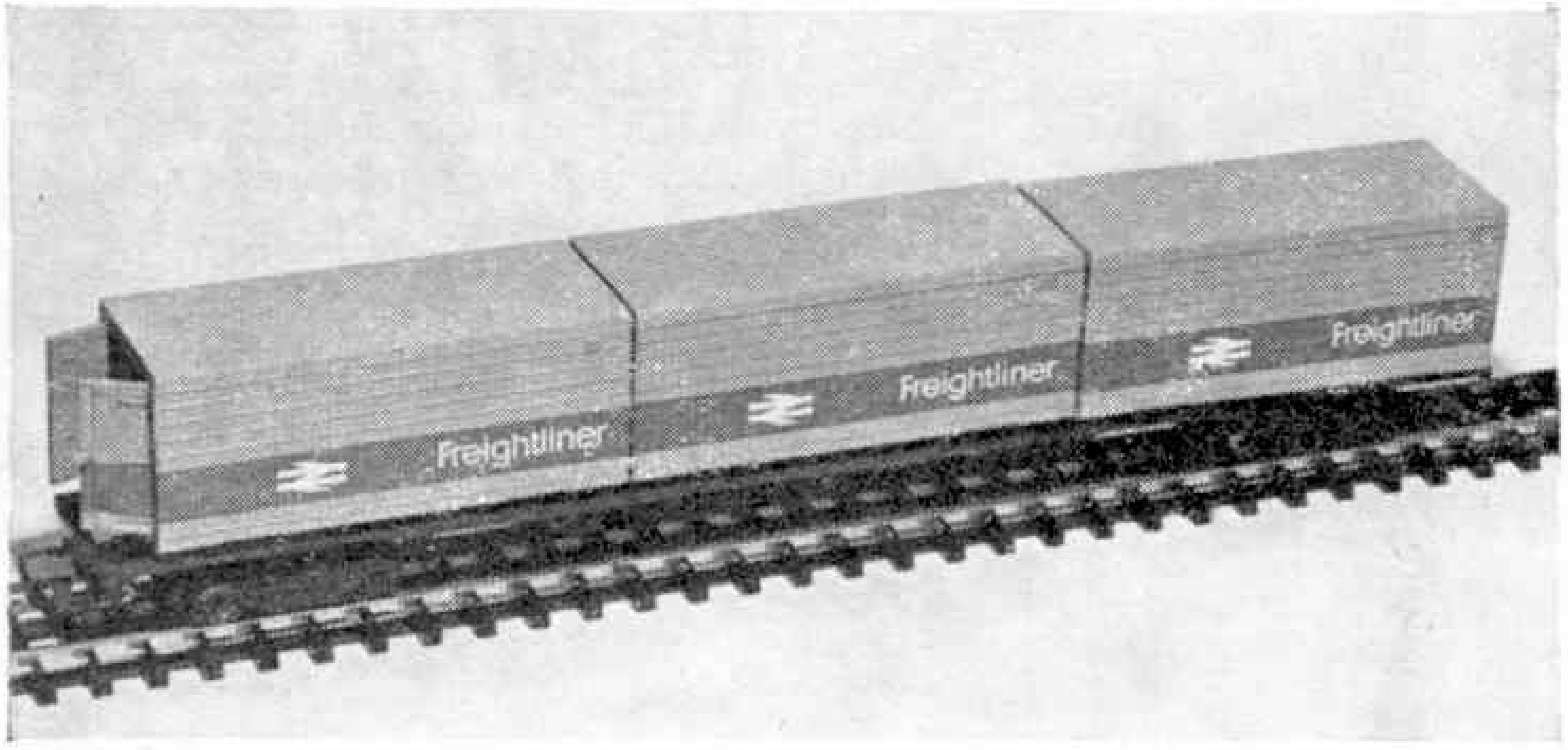
Building Bangthorn—6—The Scenery

By Mike Rickett

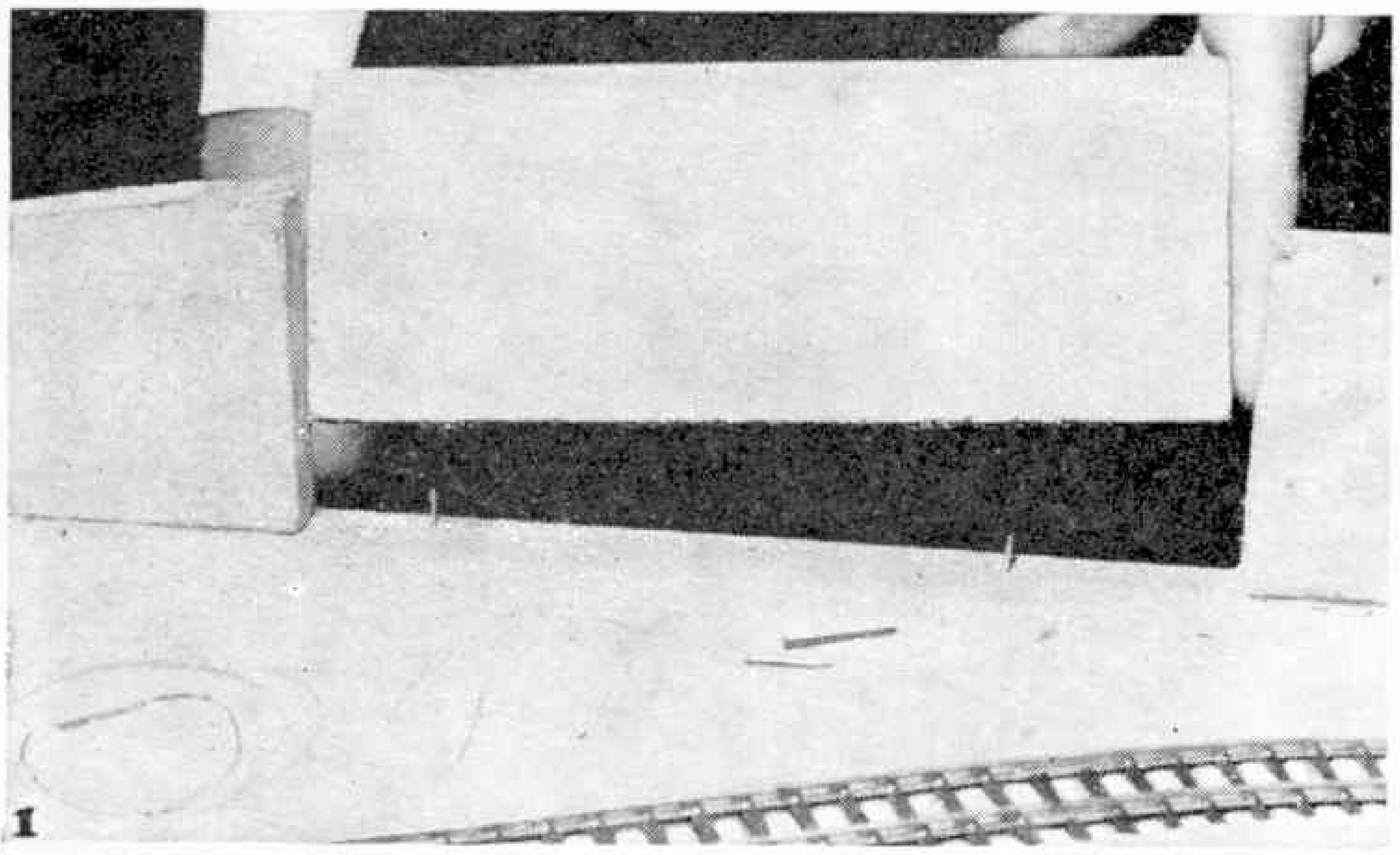
WE this month, describe the final step in the construction of 'Bangthorn' and show how basic scenery can be produced using simple materials easily available from a number of sources. Before going into this, however, readers may be interested to hear that the new Tri-ang Hornby M7 0-4-4T locomotive is now available. Now that we have had an opportunity of examining it, we are even more convinced that it will be in great demand. A very fine piece of workmanship, the opening smokebox door and 'fire' glow in the cab add much to the model's attractiveness. Also now available is the new Tri-ang Hornby Freightmaster wagon which we have described in a past issue of the magazine. A pre-production mock-up is illustrated below.



Without a doubt, realistic model railways rely primarily for their effect on the quality of model scenery, which is usually most successful when it gives an impression of the sort of countryside one would expect to see with a particular type of station layout. 'Bangthorn' is actually intended to be a rural branch line and its scenery is therefore fairly simple in character, consisting of the type of countryside one would expect to see round a station situated in a cutting, as 'Bangthorn' is supposed to be. This means that on each side of the station and at both ends, the country rises and consists of either grassy slopes or bare rock according to the angle of slope involved. This arrangement also happens to be most convenient for our purposes because it allows us to disguise various constructional features of the baseboard, such as the four hinge posts in the middle of the layout, and the supporting timbers at either end of the station. Scenery height is governed by the height of the hinge posts and supporting timbers, and you will find that approximately 3½ in. is ample enough.

Supporting the scenery is the first consideration, and you will find it convenient to fix along the upper edge of the baseboard, formers cut from ½ in. thick softboard such as 'Sundeala', which you may remember I recommended for the baseboard surface itself. If, in fact, an 8 ft. by 4 ft. sheet of this material was originally purchased, sufficient will remain for the scenery formers, which can be sawn out with a keyhole or similar type of woodsaw.

You will no doubt have noticed from our photographs, that the formers are cut to irregular shapes along both sides of the baseboard, although they all slope up in the general direction of the hinge blocks in the middle of the baseboards and the tunnel at one end of the station. Before the formers for this latter section are cut, however, I would advise placing the tunnel mouth in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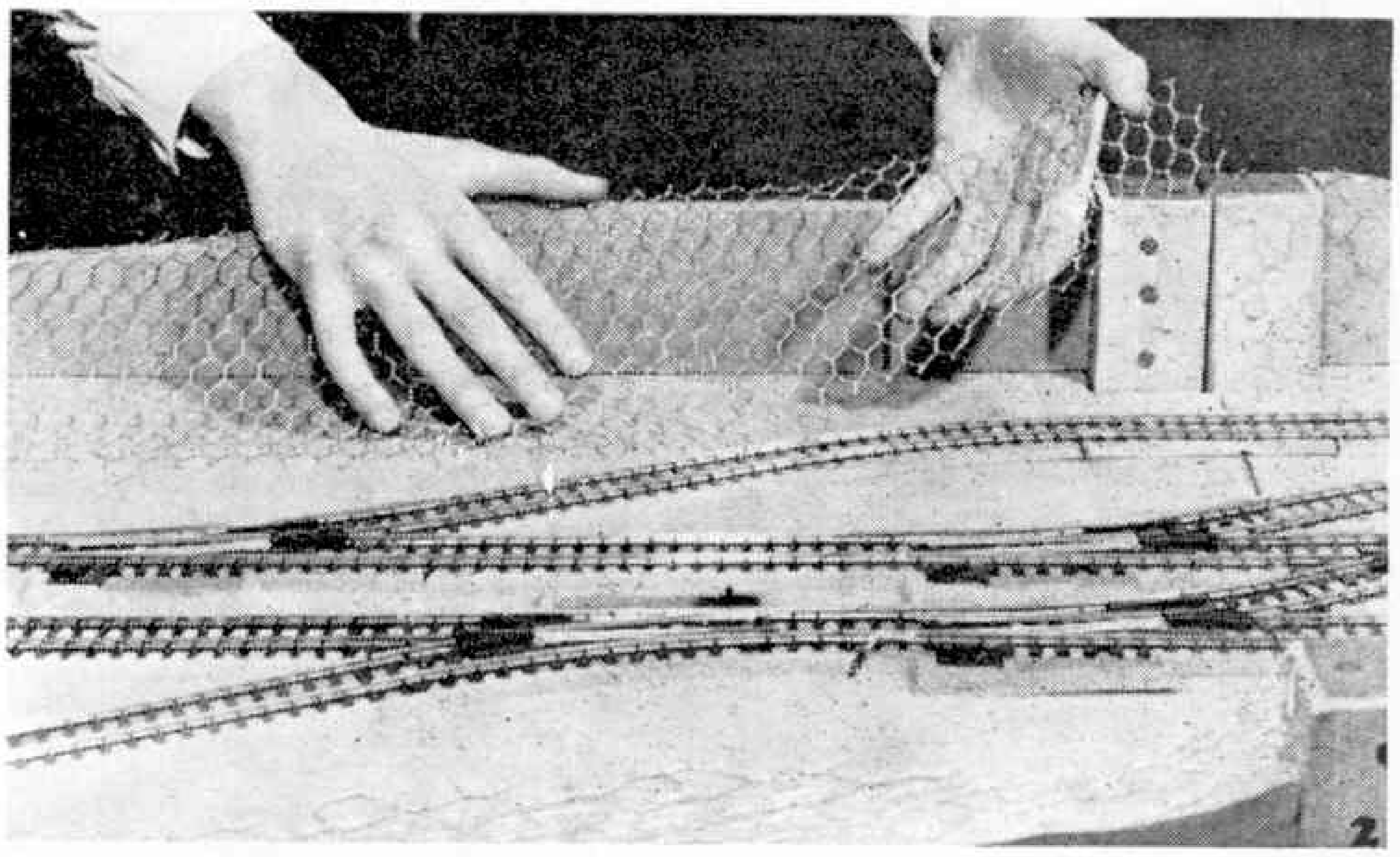
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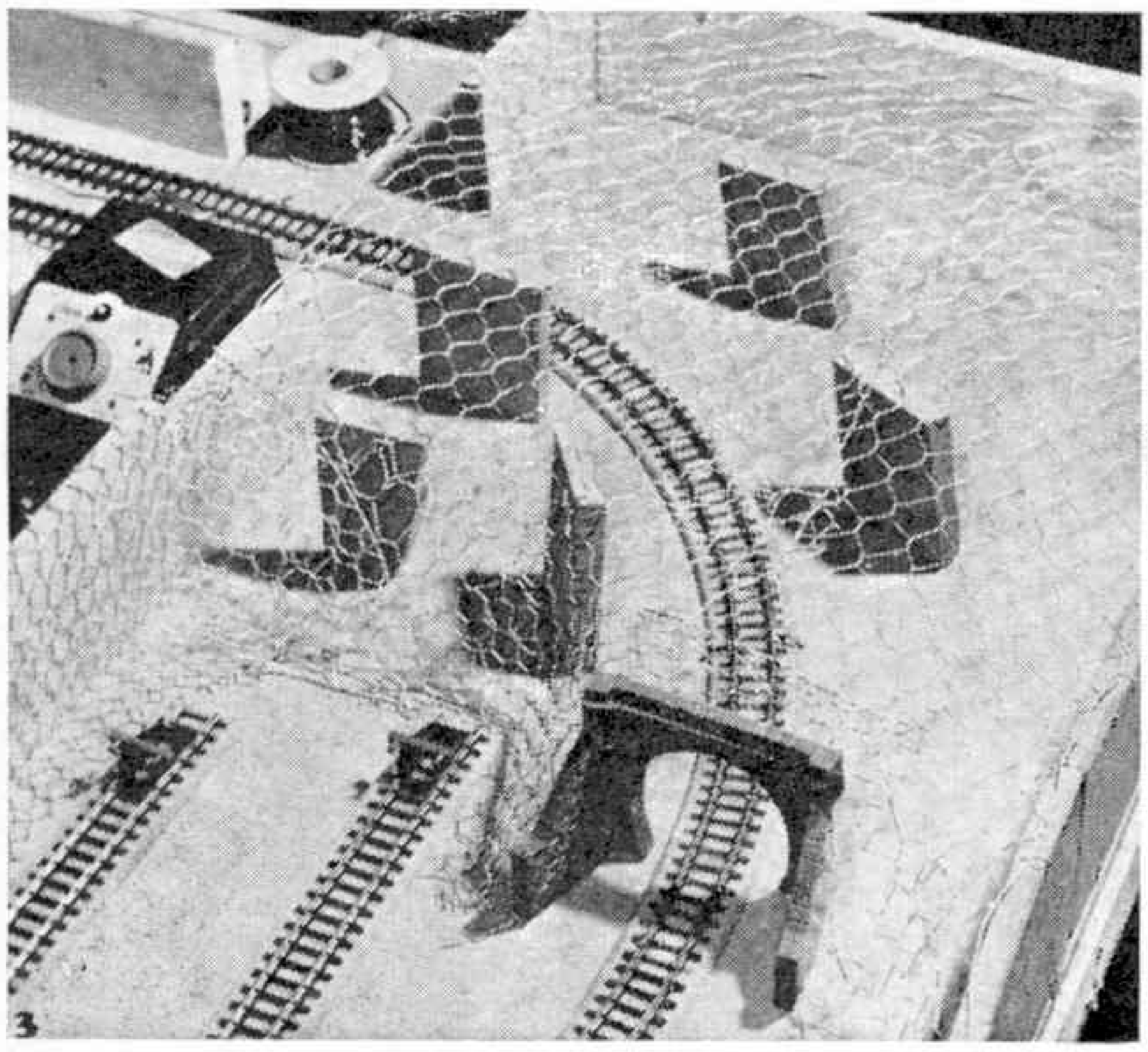
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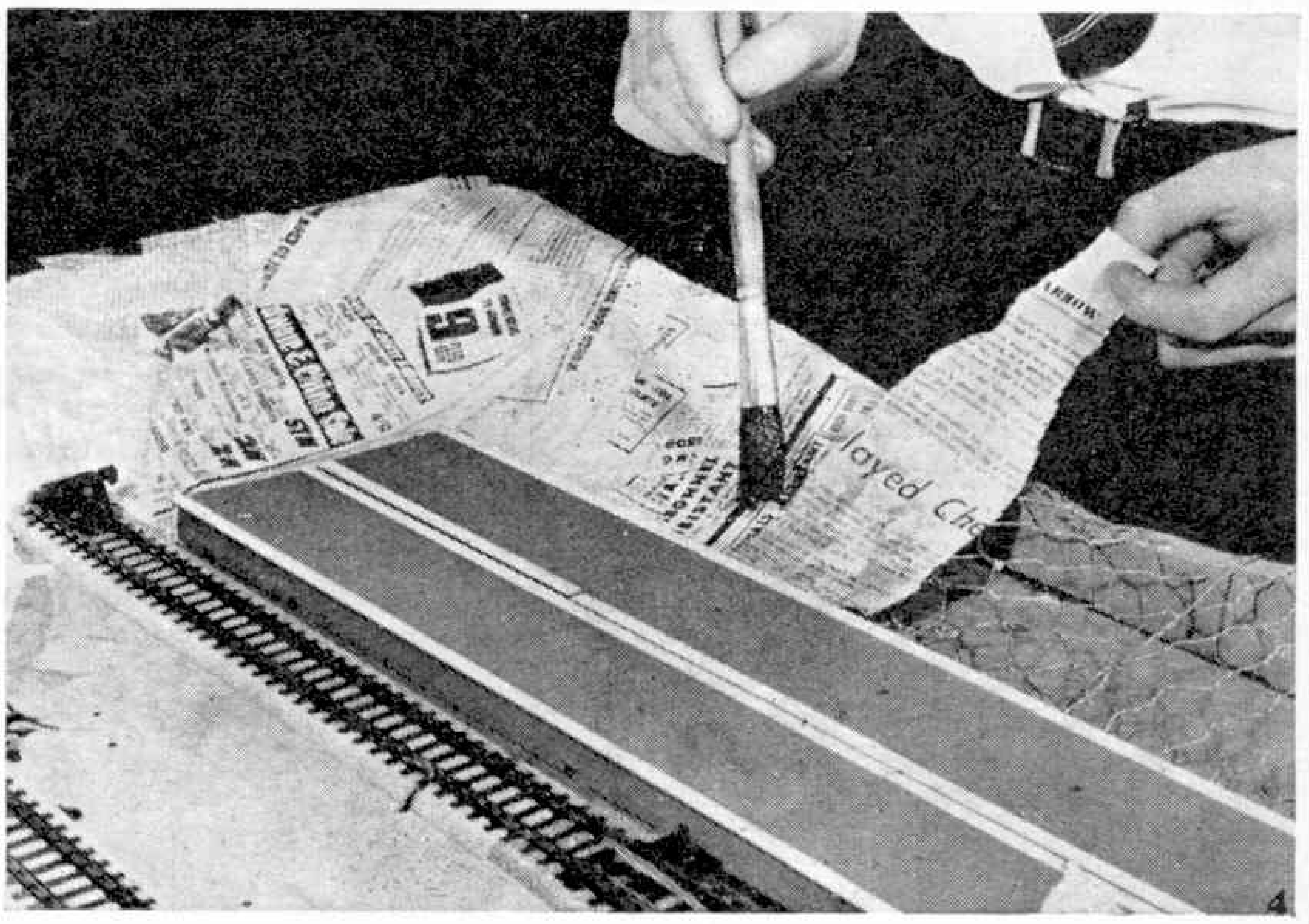
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position on the beginning of the curve to the traverser section so that the formers can be cut to blend in with the tunnel mouth.

Fixing the formers into position is quite simple and involves removing the heads of 1 in. panel pins and then pushing them into the softboard surface with a pair of pliers until approximately ½ in. stands proud of the baseboard surface. The former can then be pushed on to the pins as shown in photo 1. Each section of former is linked to its neighbour by using ordinary office staples.

Once the scenery formers are in position and stapled together, they can be covered with wire mesh to form the actual slopes. Wire mesh is available from most good hardware stores and you will find either ¼ in. or ½ in. mesh the most suitable for this purpose. Of the two, ¼ in. is, of course, proportionately more expensive than the larger equivalent, but it has the advantage of giving better support to the covering of paper laminate which is applied once the wire mesh has been stapled over the contoured formers and the baseboard surface.

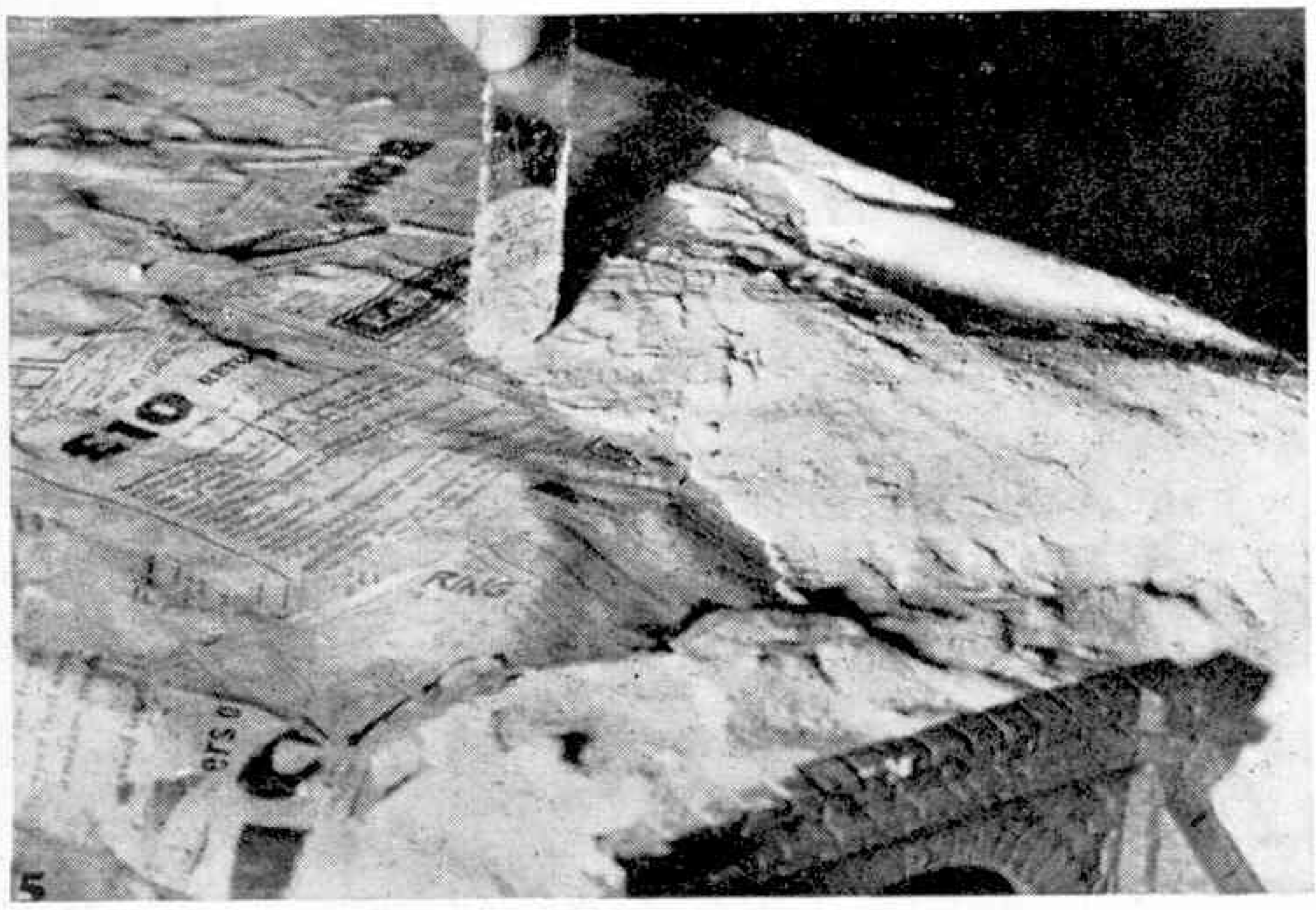
Photo 2 shows a piece of wire mesh being bent and twisted to the correct shape, and I found that an ordinary office stapling machine was most useful for attaching the wire mesh to both the baseboard surface and the top of the formers. Altogether, you will find two square yards of wire mesh quite adequate for the entire layout.

Always use a pair of wire cutters to separate the mesh and wear gloves to avoid scratching or cutting your hands. The system I always found quite successful was to cut the mesh to the approximate shape of the embankment or contour required and then to staple it into position on top of the formers. Surplus wire mesh can then be removed with the wire cutters from the backs of the formers and also from the baseboard surface if necessary. Wedge the tunnel mouth into position with wire and ensure that the tunnel area is adequately supported underneath with blocks of wood simply stapled to the wire mesh as in photo 3. Also make sure that the embankment near the hinge posts has a join in the same position as the hinge and be most careful not to staple the wire across the join in the baseboard surface.

Once the wire mesh is in position, it is covered with paper laminate, laying alternate layers of paper and pasting on to the wire mesh as in photo 4. It is easier to split the newspaper into strips and to paste consecutive layers over the mesh until approximately four or five layers have been applied. This method is extremely simple and effective, gives strong scenery and a good surface for the final covering of plaster. It is, however, somewhat messy and you would be well advised to wear old clothes. An important point to watch, however, is that the paper is glued on both the wire mesh and the baseboard surface and also from the top of the formers down along their backs so that the edges of the mesh are held in position by the paper and glue. You will find that the entire layout can be covered in a few hours, although if more than three coats are applied at the same time, allow these to dry before continuing.

It will be necessary to allow about 24 hours for the paper laminate to dry completely and you should then test it in places to make sure that it is of the correct thickness. Further treatment can then be given to the contours by mixing Polyfilla and water into a creamy mixture, and by adding sufficient sand to make it coarse. It can then be applied on to the paper laminate with an old knife which should be used to spread the mixture on to give a thickness of approximately 1/16 in. Photo 5 shows the ground above the tunnel being dealt with, and you may be able to see from the photograph the grain that the sand gives to the mixture. It should also be used to represent the ground between the track ballast and where the mixture has been spread over particularly steep contours, it can be gashed and worked to represent a rock face. Parts of the layout that particularly lend themselves to this treatment are the contours in front of the hinge blocks and at the end of the baseboard near the station platform. Only one coat will be necessary, although if you find cracks appearing, apply a second thin covering once the first coat has thoroughly dried.

Up till now, the method of producing the scenery has been fairly standard, but the step of representing scenery surface can be done in several ways. One which might appeal to readers is the use of Tri-ang Hornby King Size Colourings sprinkled over a coating of glue. This has the great advantage of simplicity and all shades of grass and earth can be represented with the considerable range of colourings available. The second method, first developed in America, involves the use of a spray gun and dry powder colours mixed together to represent grass, earth or rock. The spray gun is used to cover small areas of the scenery with a film of water, and paint is then sprinkled on dry with a sieve. Whichever method is used, however, it is desirable for you to give the entire scenery surface a coating of dark brown, and I would suggest that you use, for this purpose, a Raw Sienna powder colour mixed with water. Once this has dried, you can then spread on glue with a brush, and use King Size Colourings, or you can spray the scenery with water and sprinkle on the dry powder colour. Photographs 6, 7 and 8 show this latter method being used.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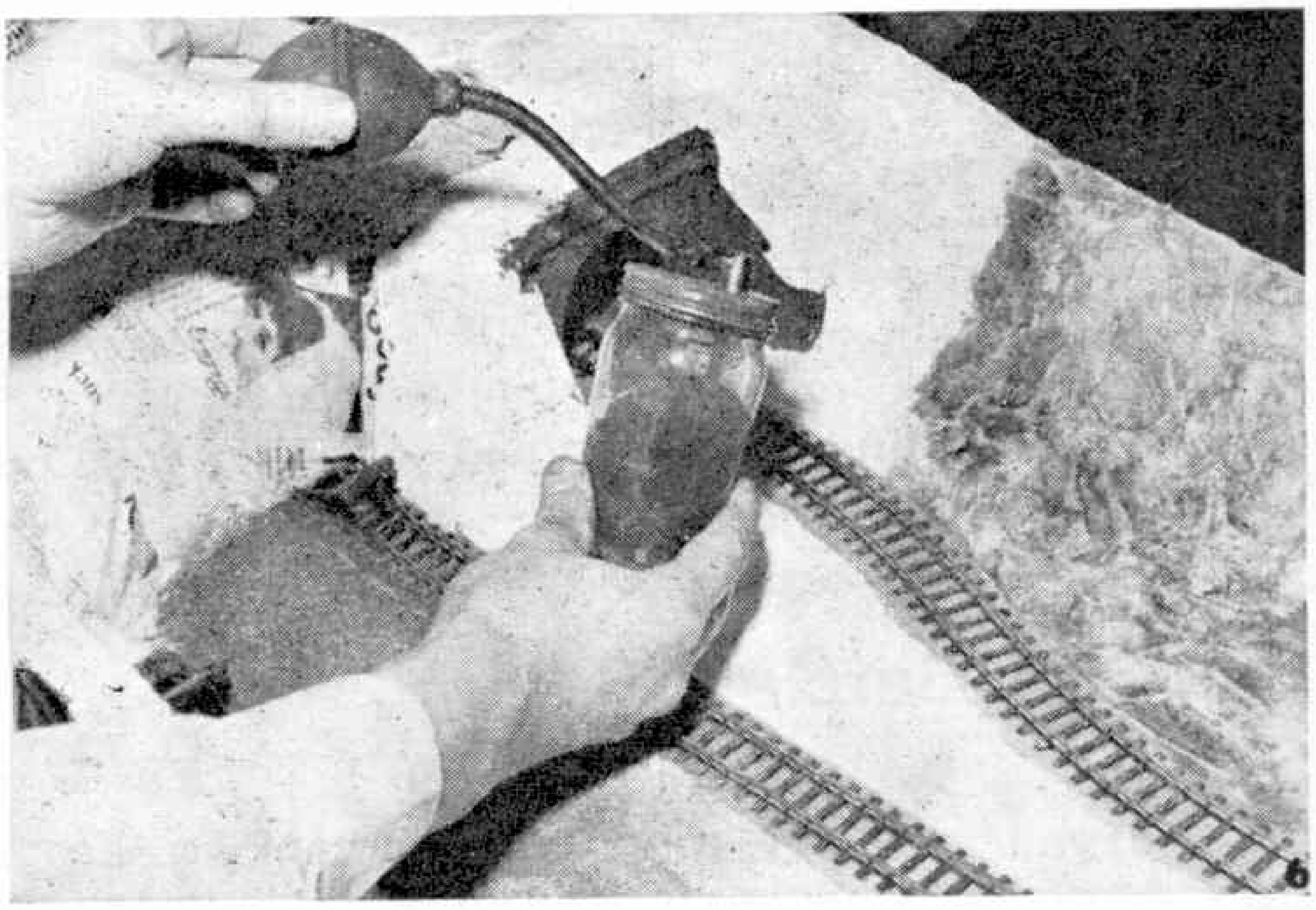
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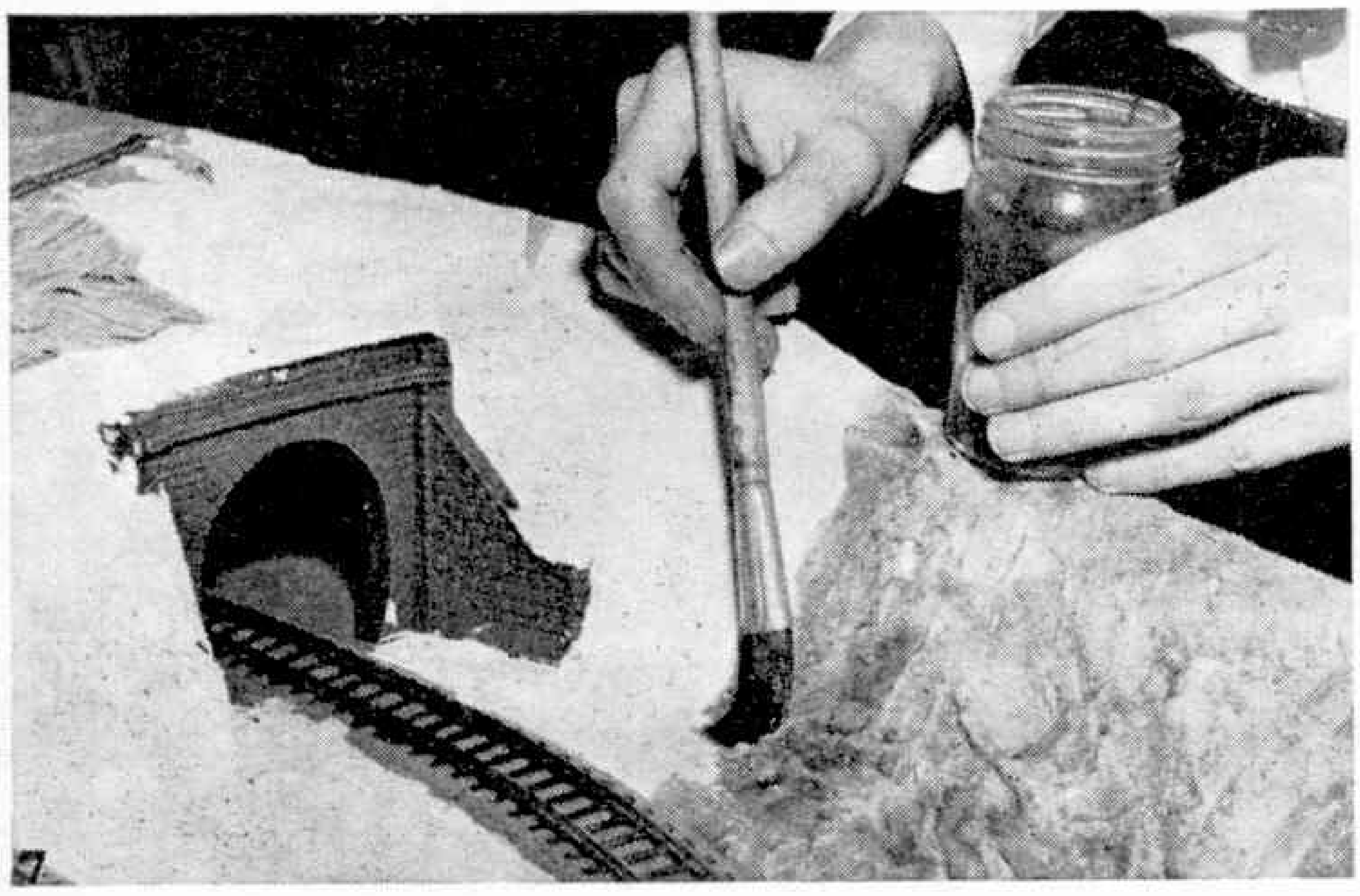
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8

Thinking about a career? Tear this out and keep it handy

The place of unpolished trousers

When finally you leave school you will have sat at a desk, cramped and largely silent, for some seven thousand hours. Which perhaps explains why so few school-leavers ever miss their old class-rooms. The Science lab, yes. The woodwork shop, yes. The Gym, perhaps. The class-room, no.

Seven thousand hours of sitting still. It is a solemn thought. Human bodies were not meant to be confined to one position for hours at a stretch. And human beings were not meant to remain silent, locked up in themselves, for long periods. Yet, if you choose many of the careers available to you today, you can repeat this absurd, isolating desk routine all over again—for the rest of your working life perhaps.

What is the alternative? Dig ditches? Not necessarily. There are always some professions that offer you movement and the constant stimulus of other people's company, male and female. Banking is one of them.

Have you ever been inside a branch of Barclays Bank? An interesting spectacle. Constant movement. Repeated comings and goings back and forth among the staff. Questions and answers. Opinions asked. Facts checked. A puzzled frown of concentration here. A shared private joke there. Not much sitting down at Barclays. Plenty of movement. Lively, alert like a market place. Something always going on.

That is just one reason why young men like working at Barclays. One of the *minor* reasons.

Barclays Bank

If you have never thought about banking as a career before, but would like to know more about it now, complete this coupon so that we can send you our booklet 'The Business of Banking'. *Send the coupon to The Staff Manager, Barclays Bank, 54 Lombard Street, London, E.C.3.*

Please send me your booklet 'The Business of Banking'.

Name ____________________

Address ____________________

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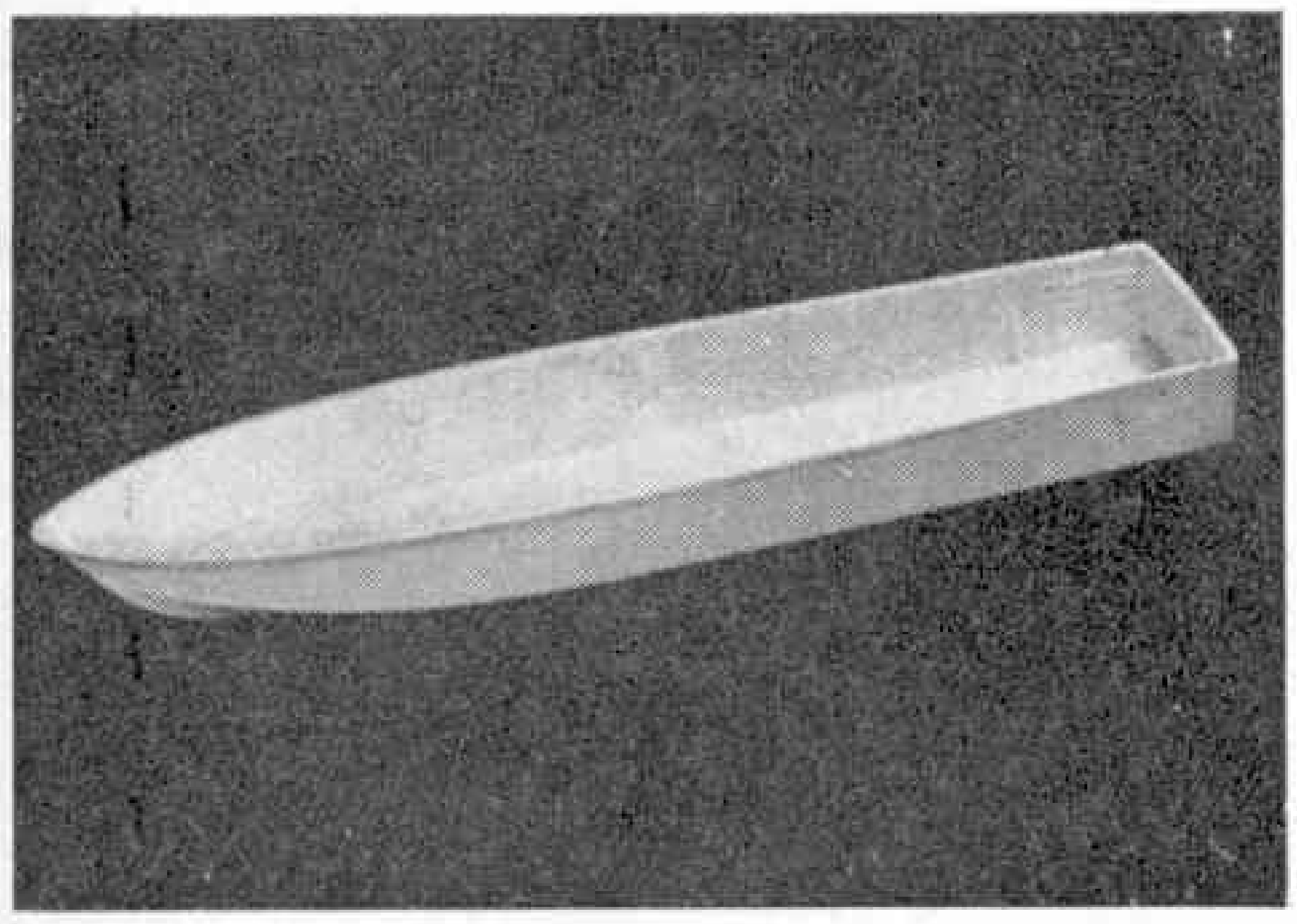
B

No Knife needed

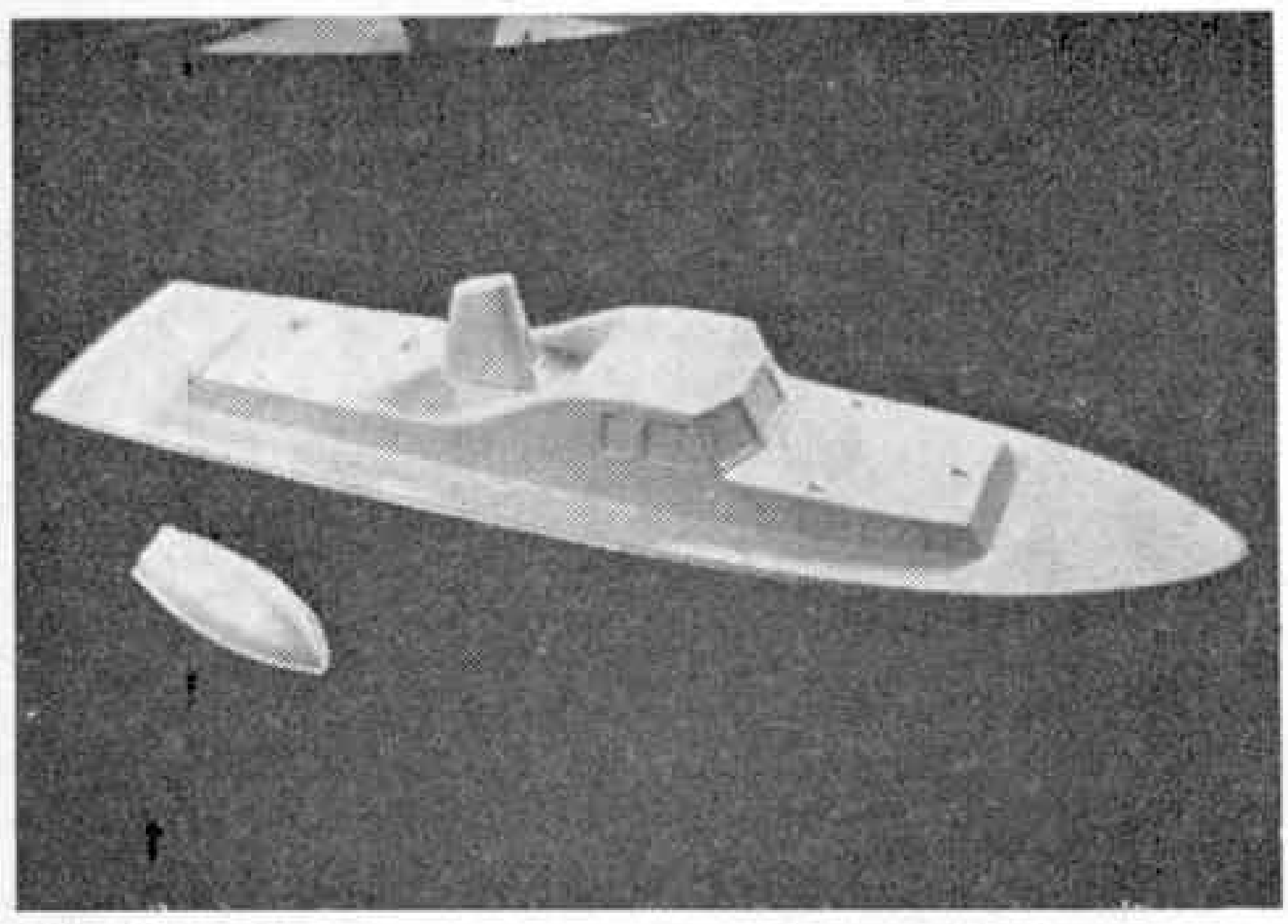
For many model boat builders, the construction of the hull is the most demanding but least interesting part of the project, yet accuracy and sound workmanship are more essential here than anywhere else. These three new Frogflight-Enterprise designs overcome the problem by supplying a finished, strongly moulded plastic hull, all ready for motor installation and the individual superstructures.

Three styles are currently included in the range; a Cabin Cruiser, Motor Torpedo Boat, and Patrol Boat. The first two employ built-up balsa superstructures, the parts for which are all pre-cut and pre-coloured. Assembly is both easy and interesting, but if you want a finished boat in even shorter time, then perhaps the Patrol Boat is the answer. This one comes with a completely vacuum-formed superstructure, deck and dinghy.

All three kits include plastic moulded deck fittings, wire and electric motor, propeller shaft and tube. At 21s. each, they offer excellent value.

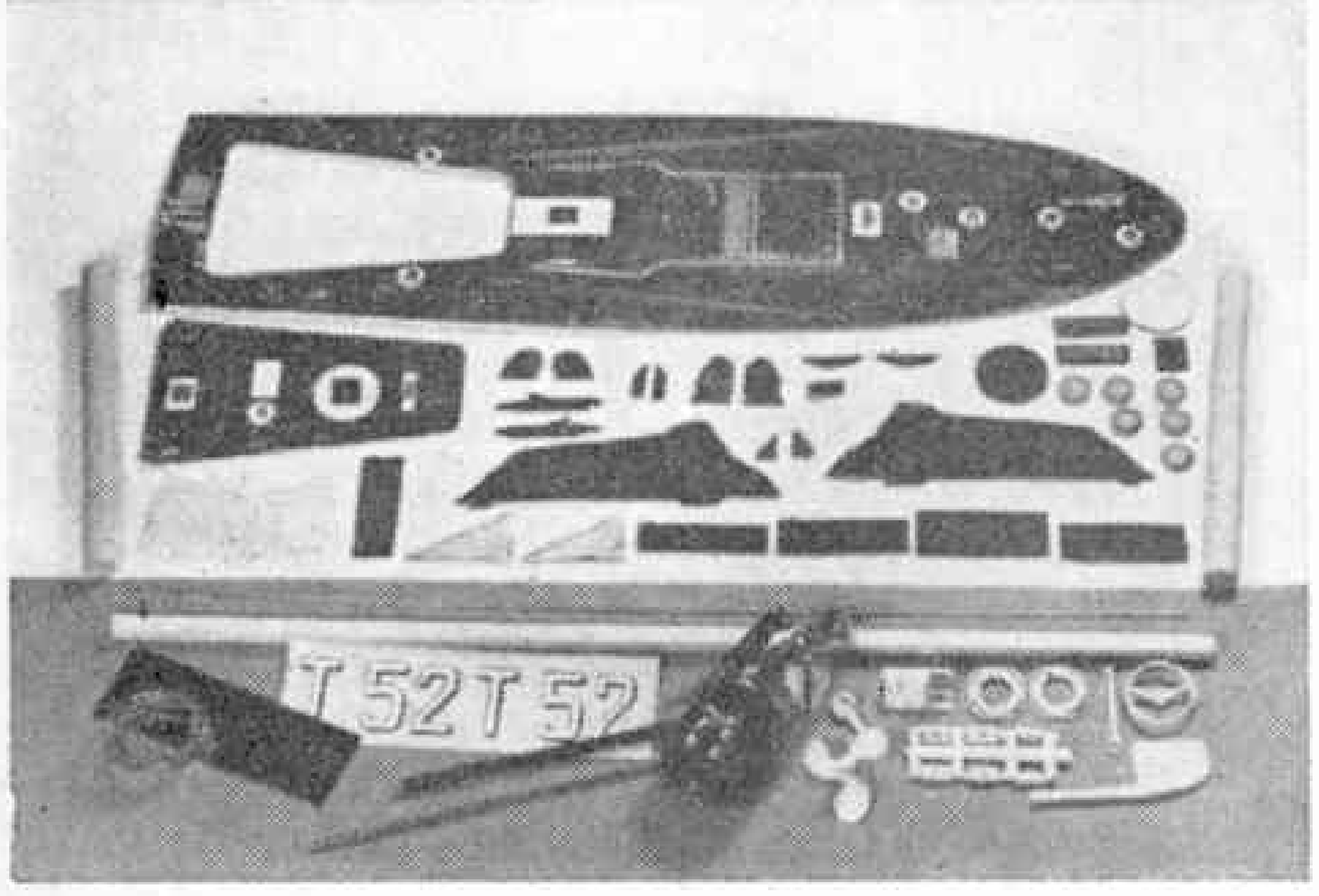


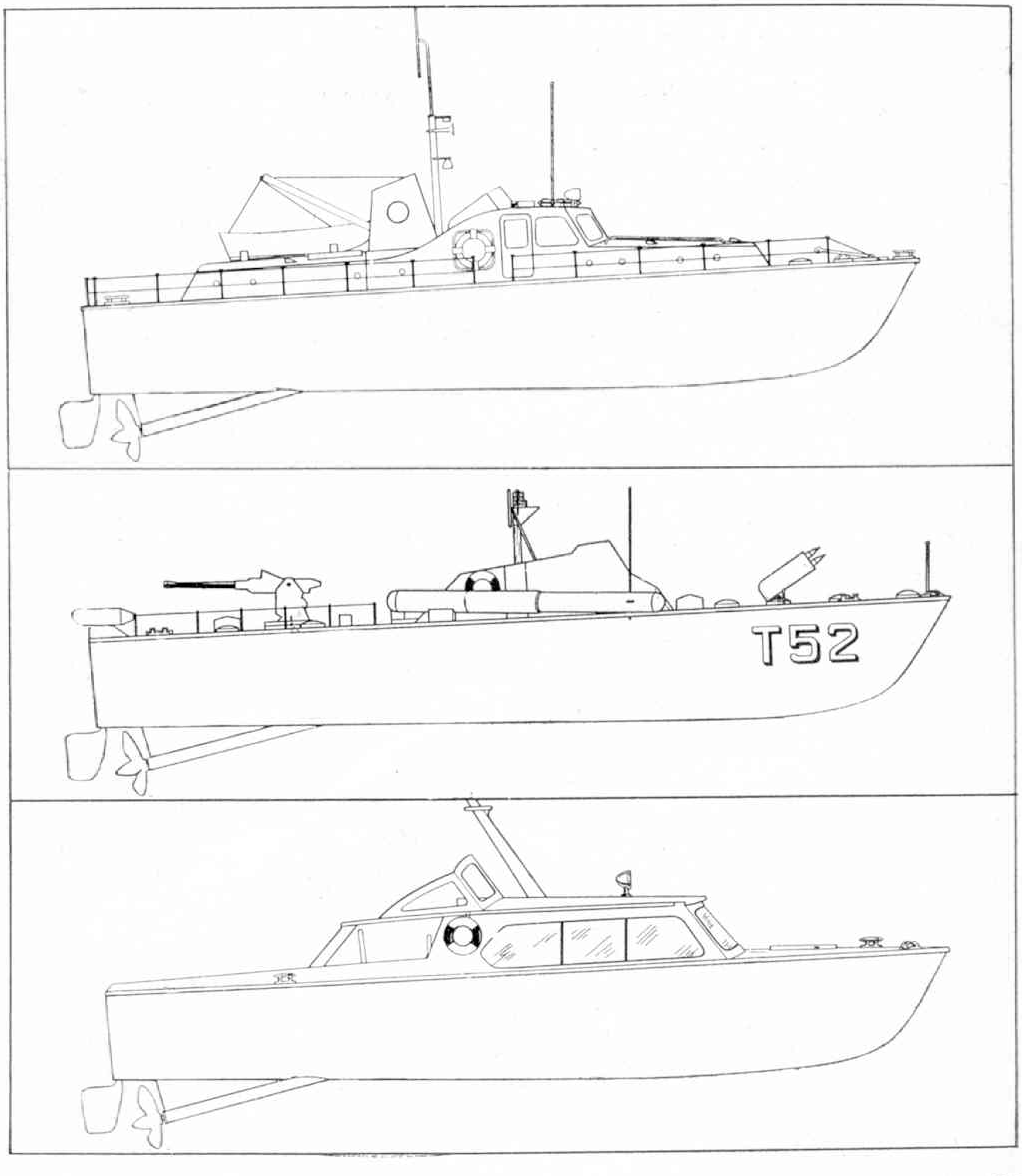
The strongly moulded hull is well designed and ready for motor and deck fittings



The Patrol Boat superstructure is completely vacuum-formed

Pre-cut and coloured balsa parts together with deck fittings and motor for the Motor Torpedo Boat

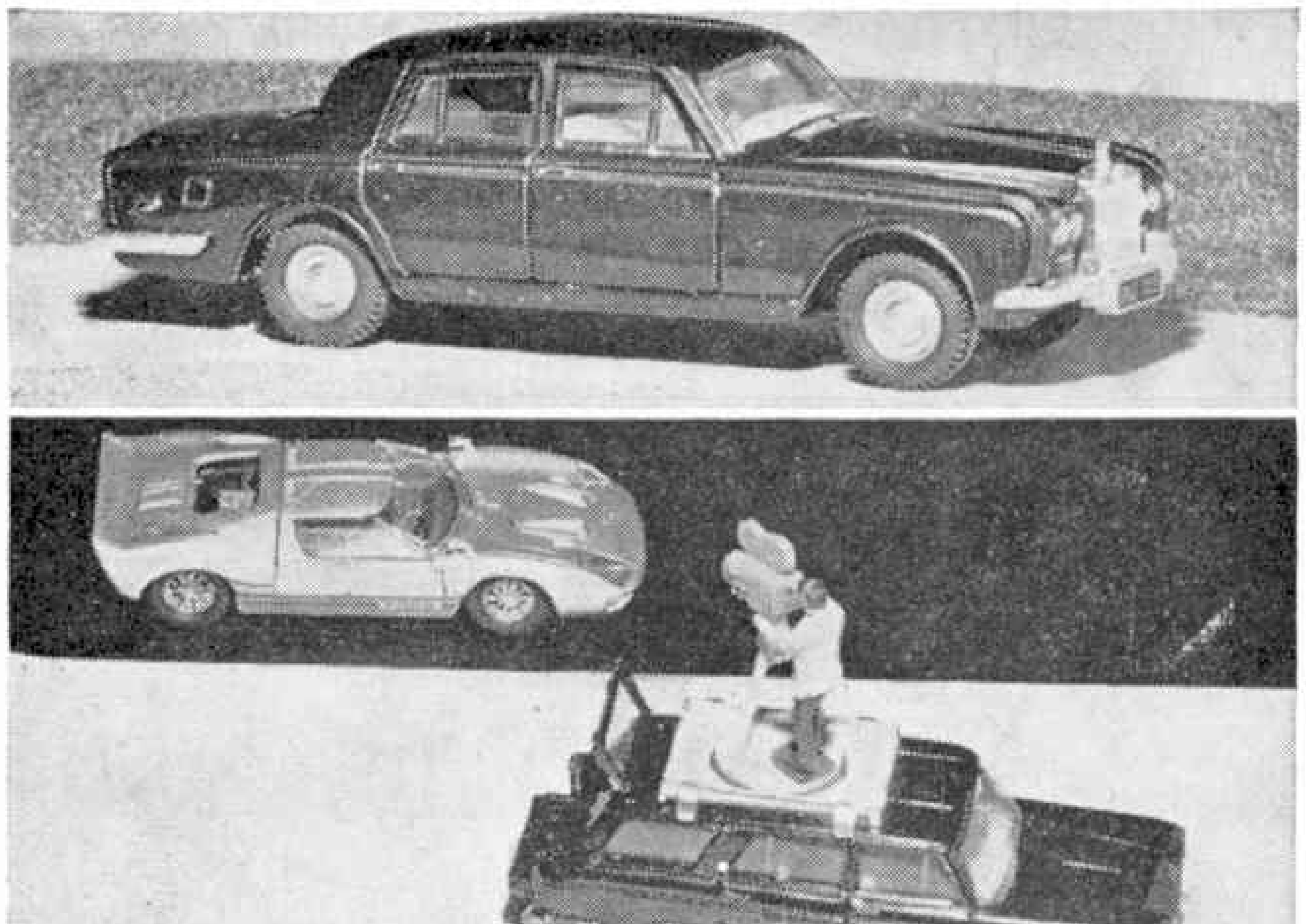




AN INTERNATIONAL TRIO

BY JOHN BREWER

Rolls-Royce, Fiat, Ford — the three latest Dinky Toys cover the whole spectrum of the motoring world. The 'Silver Shadow' looks swift and luxurious, the Ford GT aggressively fast, and the Fiat Station Wagon appears in an unusual guise as a camera car.



IN the May issue of M.M. I described a simple conversion based on the Dinky Toys' Ford Model 'T'. This month I am going to describe three brand new Dinkys, the first of which is also a Ford—but it bears no comparison with our friend the 'T'. It is, in fact, the Ford GT, one of the most startling racing machines in the 'Gran Turismo' category, and one which has built up an enviable reputation for itself in recent years. As the photograph shows, the Dinky model captures perfectly the look of the real machine—that low, wide, road-hugging look with downward-sloping nose and swept-up 'spoiler' at the rear. The windscreen is wide and very steeply raked, giving a good view of the red-upholstered interior. The engine-cover at the rear hinges upwards to reveal a very detailed integrally cast replica of the Ford's huge power-plant, a V8 based on the famous 'Galaxie' engine, with a capacity of—wait for it—*seven* litres! All the essential features of the engine can be clearly seen; eight carburettors (one for each pot) nestle between the twin valve-gear covers, and a four-branch exhaust manifold sprouts from each side of the engine. With the lid shut, the engine peeps provocatively through a glass panel.

The model is finished in metallic silver, with the now fashionable racing stripes and the legend 'Ford' below the door in red. Headlamp recesses are bright red, and the wheels, which have finely cast individual 'wire' spokes and dummy 'knock-off' hub-caps, are silver. As befits a racing machine, the model has 'solid' suspension—a good thing, when you consider that many of these cars will be destined to a very hard life racing on school playgrounds, and similar imaginary Daytonas and Sebrings!

As you can see in the photograph, the Ford GT is being 'filmed' by a Pathe News car. This is another new Dinky, and is, in fact, another version of the existing Fiat 2300 Station Wagon. A special roof platform is fitted, with a revolving table, upon which stands the camera and cameraman. The camera itself, moulded in plastic, revolves on its tripod and is quite a work of art in its own right. It represents a 35 mm. camera of the type used for television film work, and the details include the triple-lens turret at the front, film casettes on top, and various knobs and buttons all around, the functions of which are best known to the cameraman! The latter gentleman is modelled in an operating stance, complete with earphones, and is attired in a rather striking pastel blue jacket and grey trousers. Both he and his camera stand on the turntable, and can be rotated through 360 degrees. The car itself includes opening bonnet and detailed engine, opening tailgate, 'jewelled' headlights, sprung suspension and Prestomatic steering. The whole vehicle is finished in gloss black, with 'Pathe News' along the sides in white letters, and very smart it looks.

Human nature being what it is, I have kept my favourite of this new trio until last. It is, in fact, no lesser vehicle than the Rolls Royce Silver Shadow and, in my opinion, one of the nicest Dinky passenger car models ever made. The Silver Shadow itself is not an easy prototype to reproduce in model form—it's a rather plain, reserved looking car, with very subtle lines, and it would be all too easy, in die-cast miniature form, to reduce it to a mere 'slab'. However, Dinky Toys have not allowed this to happen to their Silver Shadow, and the model bears a quite uncanny likeness to the real thing, even reproducing, by some strange means, the stately and luxurious atmosphere of 'The Best Car in the World'. Weight has something to do with this exclusive atmosphere; the real Silver Shadow looks heavy, and is, at about two tons unladen, and its Dinky counterpart tips the scales at only a little under half a pound—quite a weight for a 4¾ in. long model.

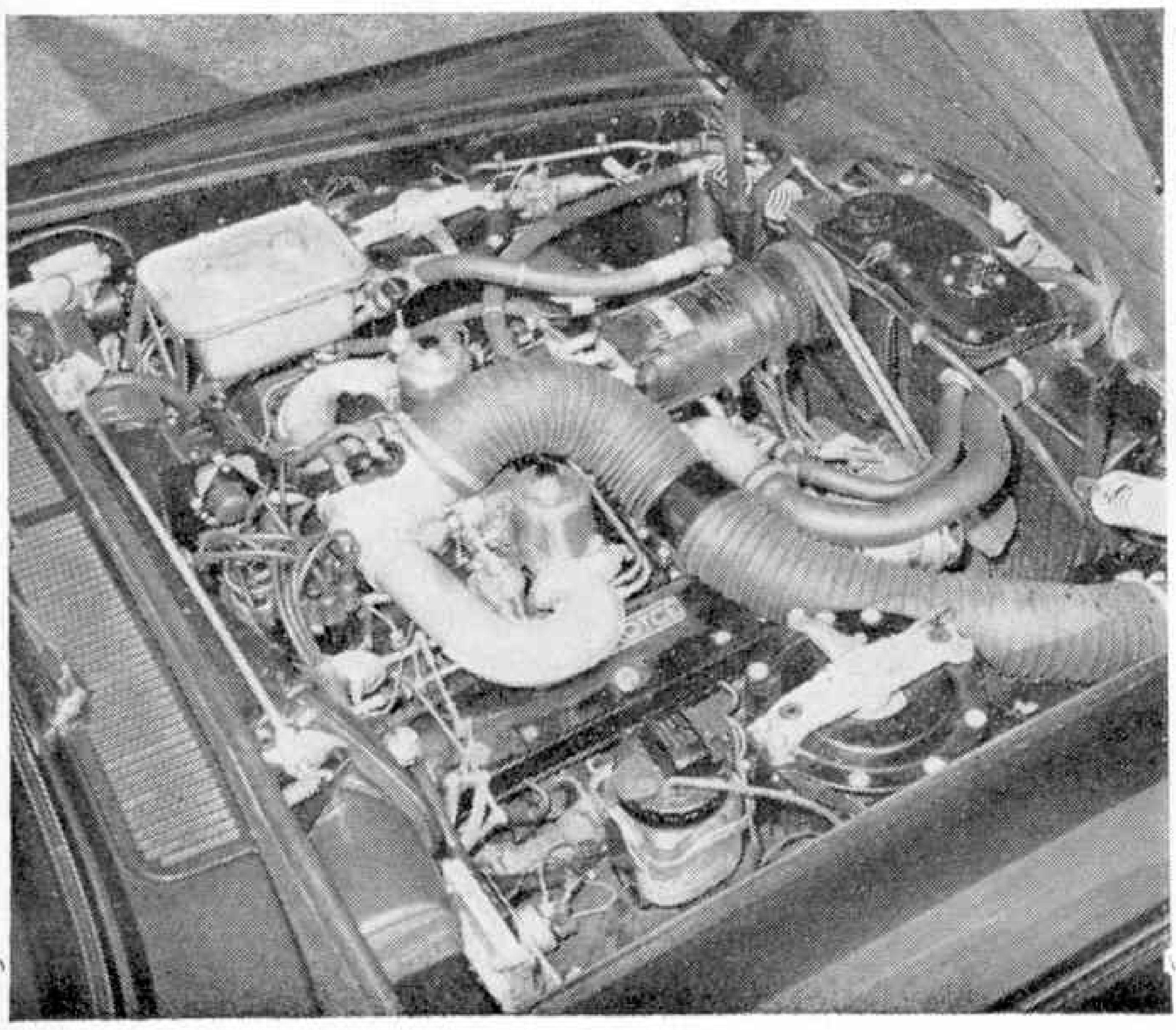
The next ingredient for the true R.R. atmosphere is the paint finish, which must, by tradition, be faultless, and the result of many coats and much laborious rubbing-down. The Dinky model is finished in a rich, slightly metallic red, with a really good high-gloss finish, which shows to advantage on the large, flat panel areas such as the bonnet, boot and roof, and contrasts beautifully with the white interior and reserved use of exterior 'chrome'.

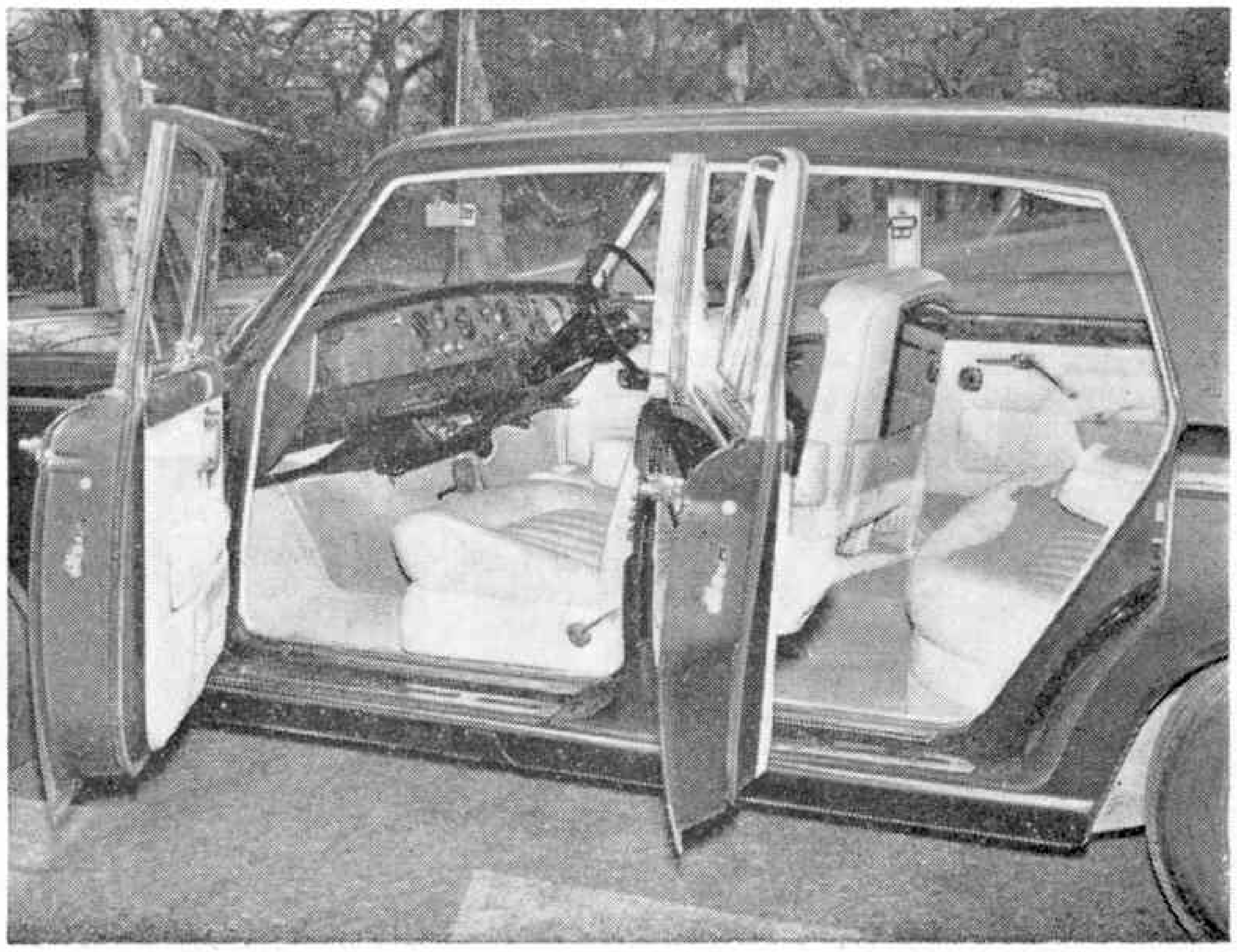
All four doors open, to reveal the luxurious-looking interior which includes trim-panels on all doors, individual front seats, steering-wheel, and dashboard with *opening* glove compartment! The door windows are modelled in the 'half-open' position, and rear-view mirror and windscreen wiper details are moulded on the windscreen. The boot door opens to reveal a 'carpeted' interior and the bonnet lid opens forwards disclosing a very full engine compartment. The big V8 engine that, via an automatic gearbox, provides silent power for the real Silver Shadow, shares the under-bonnet space with a great deal of ancillary equipment necessary for providing majestic motoring, including air-conditioning plant and the ingenious hydraulic apparatus which operates the Rolls Royce self-levelling suspension—no matter how heavily the vehicle is loaded, it does not sink low on its springs. This crowded under-bonnet effect is well represented on the Dinky model by a highly-detailed casting, on which several engine features such as carburettors, air-cleaner hose, rocker-covers, etc., are all clearly discernible.

At the front of the car stands the traditional R.R. radiator which, although it is now rather wider than it is high, and has, therefore, lost some of its former lofty grandeur, still gives the car a most impressive 'face', and is flanked by twin headlights. On top of the radiator stands the famous 'Spirit of Ecstasy' motif. The atmosphere of the model is completed by the disc type wheels, with 'R.R.' inscribed hub-caps (yes, you can actually read it!) and rather soft sprung suspension.

As you have probably gathered, I have a soft spot for R.R.'s (though not the hard cash necessary to indulge it!) but I *can* afford the Dinky version on which I can gaze with admiration. After all, anyone can dream! I must go now—the Rolls is waiting.

100 LG





Build a Vertical Log-Saw

By Spanner

HOW many Meccanomen, I wonder, while glancing through a magazine or reading a book, have seen something which they felt would make an excellent subject for a Meccano model. There must, I feel, be an enormous number, but how many of them have actually tried to build the model? Some, no doubt, but I am inclined to think that the majority, either because of lack of spare time or lack of parts or sometimes even lack of skill, have simply shrugged the idea from their minds and forgotten about it.

This, of course, is quite understandable, only I should like to point out that we, on Meccano Magazine, have the parts and we like to think that our model-builders have the skill, although we do know that they are often short of time. Our model-builders, however, are only human and they can run out of ideas as easily as anybody else, so I must stress that we have no objection to your passing ideas on to us if you don't think you will be able to act on them yourselves. After all, we might well be able to produce the required model, as is proved by the example featured below. This is a working reproduction of a Vertical Log Saw, used to cut logs into planks or beams, and is the result of a request we received some time ago from M.M. reader Mr. W. A. Wilson of Runcorn, Cheshire. Mr. Wilson sent an illustration of the full-size machine and, in no time at all our model-builder had come up with this model. Construction is not difficult.

FRAMEWORK AND SAW FRAME

To begin with, a rectangular box framework is built up from four 12½ in. Angle Girders 1, joined at the top by two 5½ in. Strips 2 and two 4½ in. Angle Girders 3, and at the bottom by two 5½ in. by 12½ in. Flat Plates 4 and two 4½ in. by 2½ in. Flat Plates 5. The lower Bolts securing Flat Plates 5 also fix two 7½ in. Angle Girders 6 in place, these Angle Girders protruding a distance of six holes outside the box framework. The ends of Girders 6 are then joined by a 5½ in. by 2½ in. Flanged Plate which will later form the mounting for the Power Drive Unit.

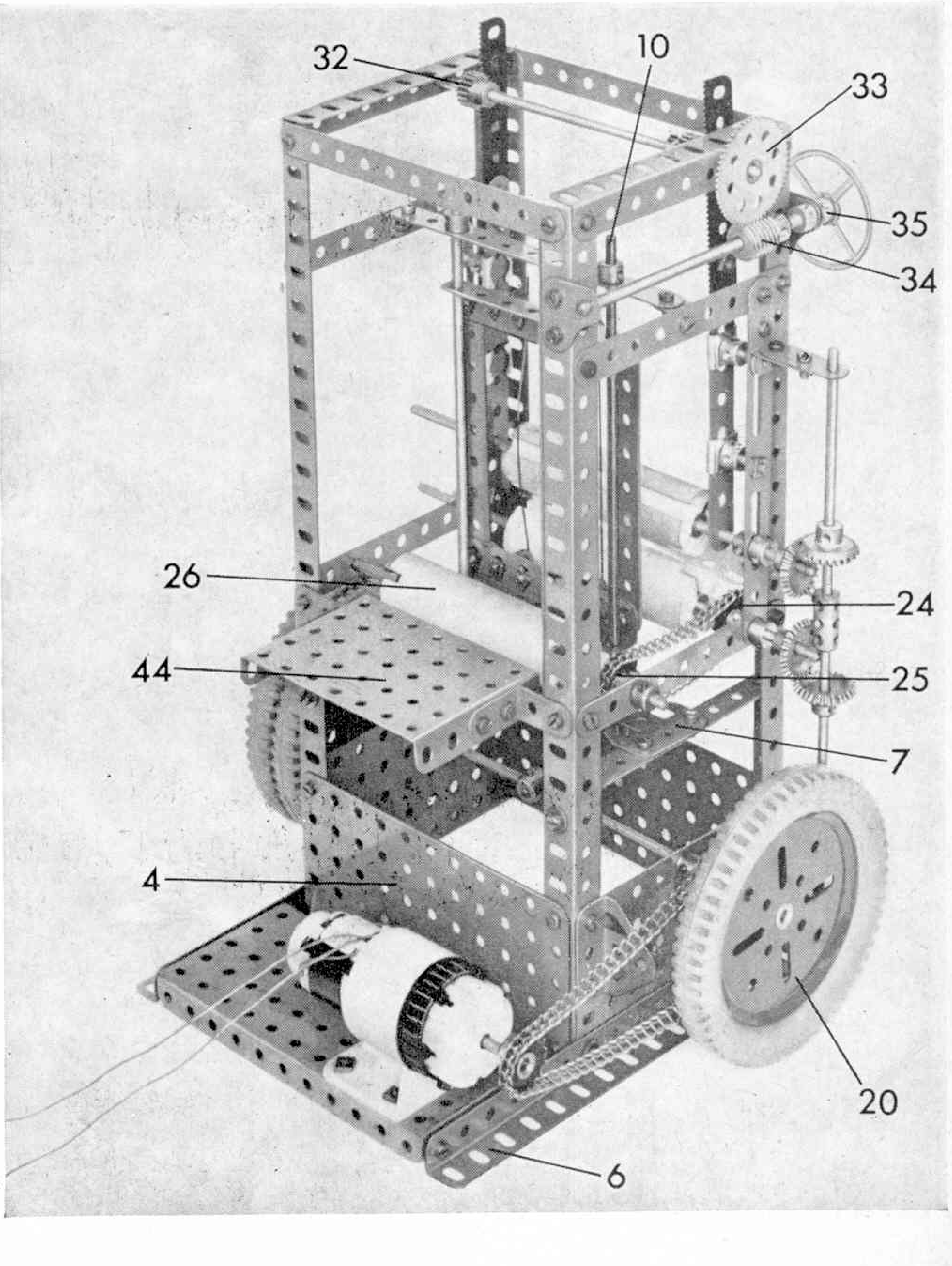
Fixed between each side pair of Girders 1 is a 4½ in. by ½ in. Double Angle Strip, to which a Flat Trunnion 7 is bolted and two 4½ in. Strips 8, a distance of nine clear holes separating them. Upper Strips 8 are connected by a 5½ in. Strip 9, attached by Angle Brackets. Journalled in this Strip and in Flat Trunnions 7 are two 8 in. Rods 10, held by Collars, which serve as the mountings for the saw frame. The saw frame, itself, is built up simply from two 3½ in. Angle Girders 11, the ends of which are each joined by two 4½ in. Strips placed one on top of the other. Four Angle Brackets 12, arranged in pairs as shown, are bolted to each Girder 11 to provide the anchoring points for two suitable lengths of fret-saw blade which are clamped by a Nut and Bolt between the protruding lugs of the Angle Brackets.

Bolted beneath the horizontal flange of lower Girder 11 is a 1 in. by ½ in. Double Bracket, its lugs pointing downwards. Mounted in their end holes is a 1 in. Rod carrying two Collars and a 2½ in. Strip 13 between the lugs, the Strip being positioned between the two Collars. Note, however, that the Collars must not prevent the Strip from turning on the Rod.

The lower end of Strip 13 is mounted, along with four washers, two each side, on another 1 in. Rod on the ends of which two Couplings 14 and 15 are fixed, the Rod being held in one end transverse smooth bore of the Coupling. Mounted in the other end transverse bore of Coupling 14 and in corresponding Flat Plate 5 is a 4½ in. Rod 16, carrying two 3 in. Pulleys with Motor Tyres outside Plate 5. Another 4½ in. Rod 17 is mounted in Coupling 15 and corresponding Plate 5, but this carries a Worm 18, a 2 in. Sprocket Wheel 19 and only one 3 in. Pulley with Motor Tyre 20. When the 3 in. Pulleys are turned, the saw frame should move freely up and down Rods 10.

ROLLER MOUNTING AND CONTROL MECHANISM

Having completed the saw frame as well as the basic framework of the model, we now move on to the rollers, three of which are included. The



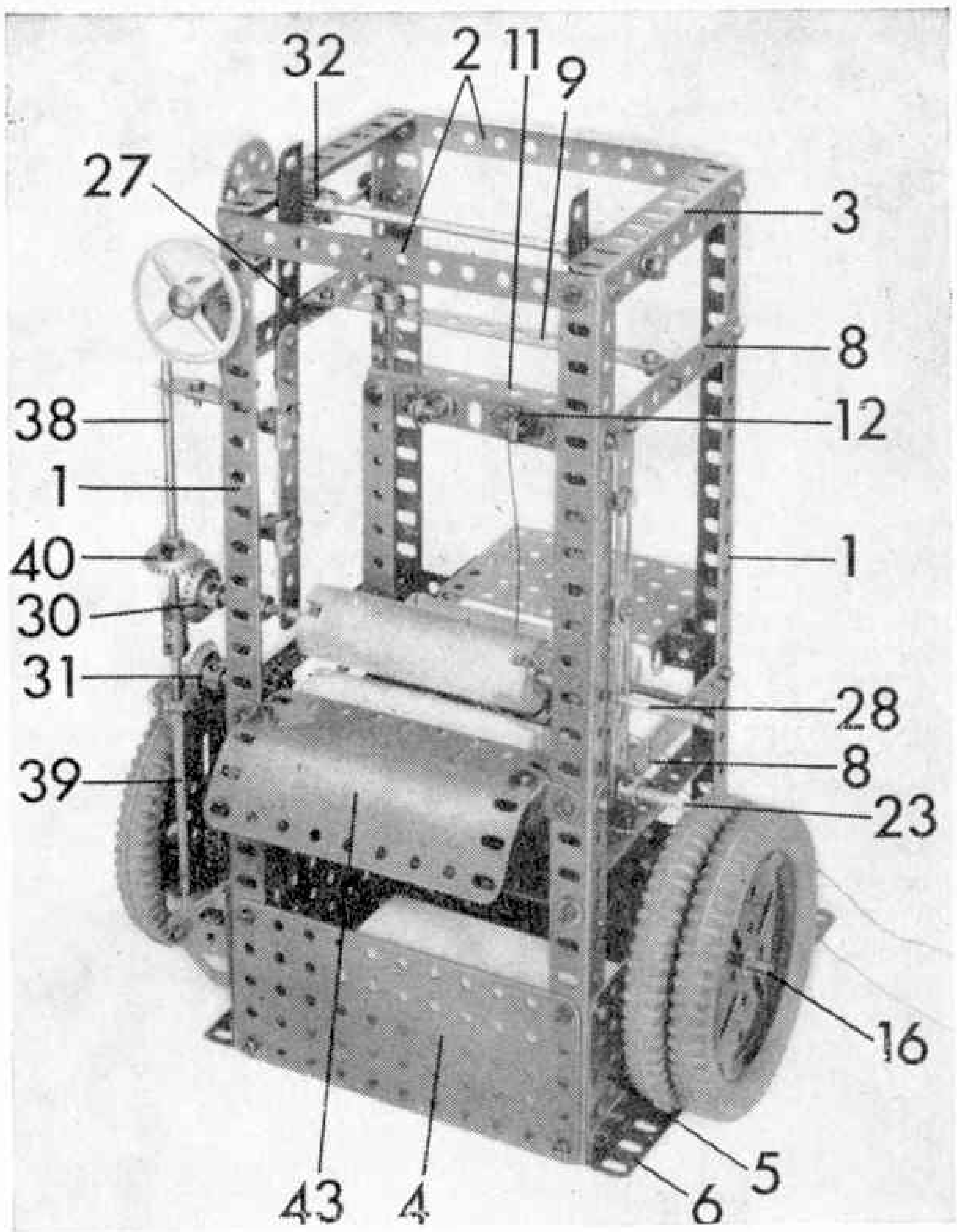
first two, mounted one above the other, work together as a pair and act as the feed-in rollers for the uncut logs, while the third serves on its own as the exit roller for the cut wood. All three are represented by standard Meccano Wood Rollers and all are mechanically driven from the Motor. In real life, of course, it is doubtful whether any two logs would be the same diameter and so it must be possible for the distance between the feed-in rollers to be altered while still allowing them both to be driven. In our model, the designer has overcome this problem in what I feel to be an excellent way!

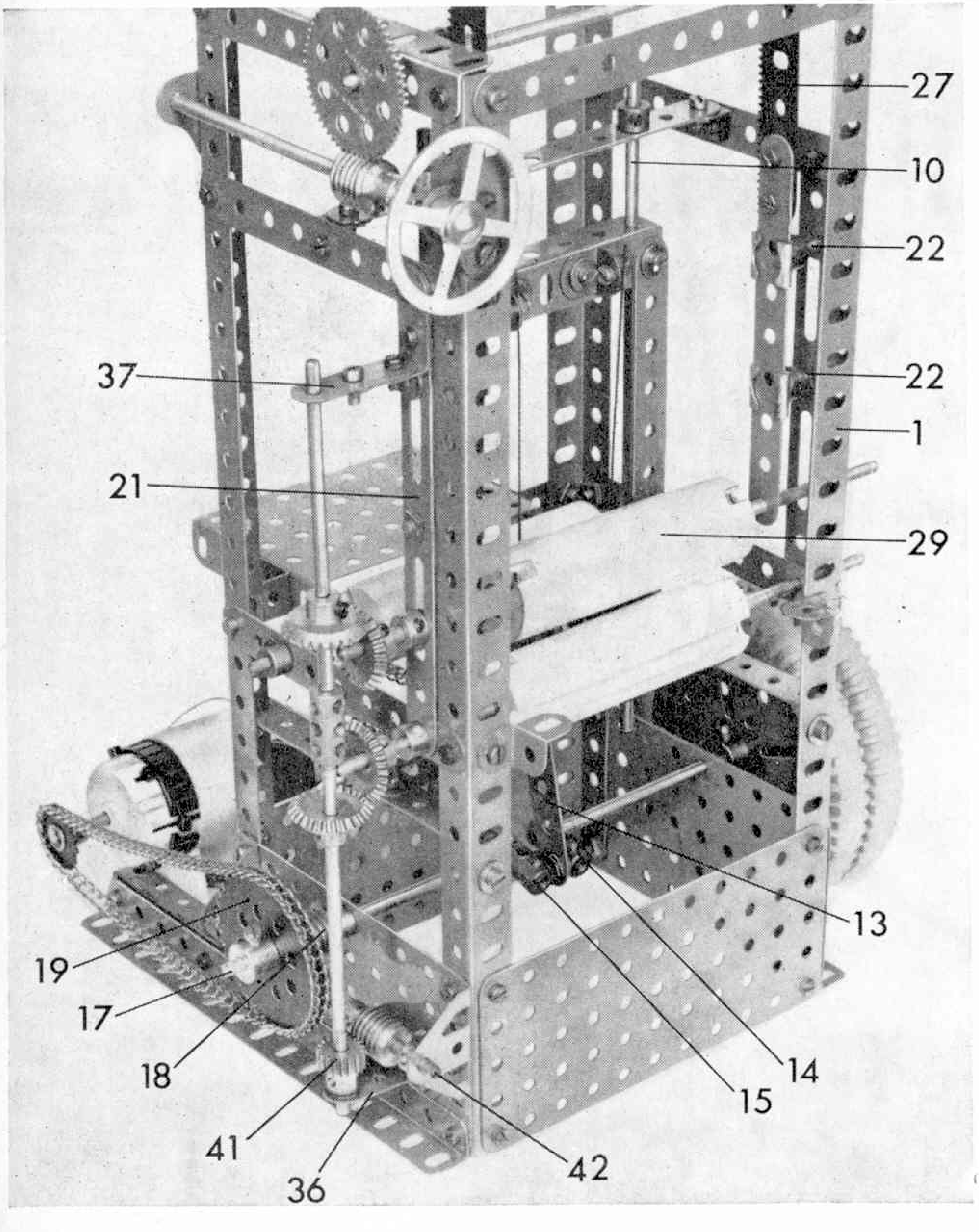
Each pair of Strips 8 are connected by a 5½ in. Slotted Strip 21 in which two Threaded Pins 22 are fixed in the positions shown, with the shanks of the Pins pointing inwards. It is important to note that the lower ends of Slotted Strips 21 are not bolted to corresponding Strips 8, but are attached by means of an 8 in. Rod 23 and are held in place by Collars. Mounted on the Rod are a Wood Roller and a ¾ in. Sprocket Wheel 24 which is connected by Chain to another ¾ in. Sprocket Wheel 25 on a 6½ in. Rod journalled in lower Strips 8 and carrying a second Wood Roller 26.

Slide Pieces are now mounted on Threaded Pins 22 to provide 'runners' for two 4½ in. Strips, each extended by a 3½ in. Rack Strip 27. Journalled in the end holes of the 4½ in. Strips and in the lower slotted holes of Slotted Strips 21 is another 8 in. Rod 28, held in place by Collars and carrying a third Wood Roller 29. The securing Collars must not be clamped so tightly that they prevent the Rod from sliding up and down in the slots of Slotted Strips 21. Two ⅞ in. Bevel Gears 30 and 31 are now fixed in position, the former on the end of Rod 23 and the latter on the end of Rod 28, while a 6½ in. Rod carrying two ½ in. Pinions 32 is mounted in Angle Girders 3 being held in place by a Collar and a 57-teeth Gear Wheel 33. Pinions 32 engage with Rack Strips 27. Gear Wheel 33, on the other hand, engages with a Worm 34 on a 5 in. Rod, journalled in 1 in. Corner Brackets bolted to appropriate Angle Girders 1 and held in place by a Collar and a Steering Wheel 35. Movement of this Steering Wheel should raise or lower feed-in Roller 29.

PARTS REQUIRED

3 of No. 2
10 of No. 2a
1 of No. 5
1 of No. 6a
4 of No. 8
2 of No. 8b
2 of No. 9a
2 of No. 9b
1 of No. 9f
1 of No. 11a
10 of No. 12
3 of No. 12a
4 of No. 13a
1 of No. 14
2 of No. 15
2 of No. 15a
2 of No. 18b
3 of No. 19b
4 of No. 26
1 of No. 27a
4 of No. 30
3 of No. 32
98 of No. 37a
98 of No. 37b
30 of No. 38
2 of No. 48c
4 of No. 50
1 of No. 52
1 of No. 53
2 of No. 53a
2 of No. 55
15 of No. 59
3 of No. 63
2 of No. 70
1 of No. 94
1 of No. 95
3 of No. 96a
3 of No. 106
2 of No. 110
4 of No. 115
2 of No. 126
2 of No. 126a
1 of No. 133
2 of No. 133a
3 of No. 142b
1 of No. 154a
1 of No. 154b
1 of No. 185
1 of No. 191
1 of No. 230
1 of No. 231
1 Power Drive Motor





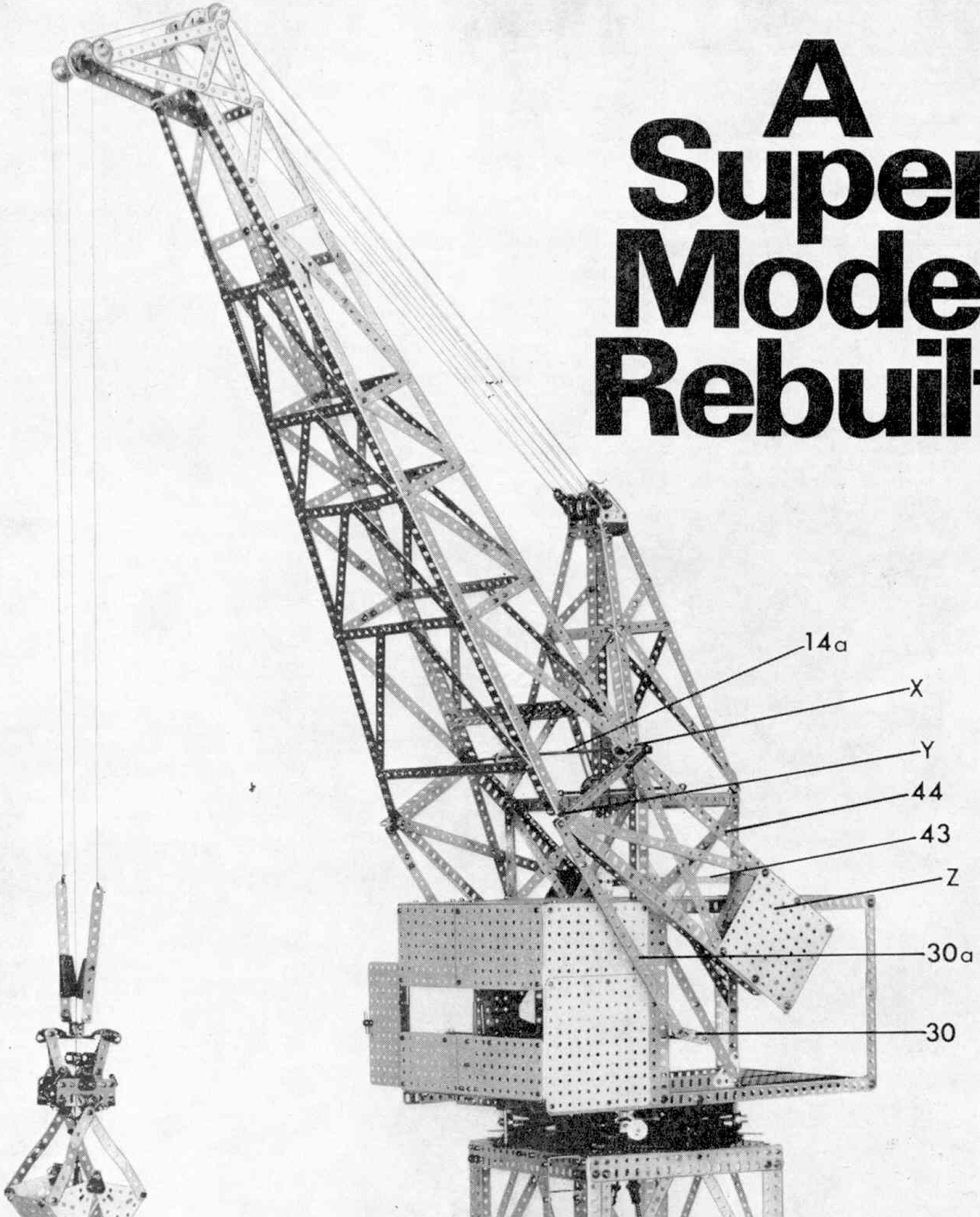
DRIVE MECHANISM

Attached to one Flat Plate 5 by a 1½ in. Angle Girder is a 1½ in. by 1½ in. Corner Bracket 36 while a 1 in. by 1 in. Angle Bracket is bolted to the upper end of corresponding Slotted Strip 21. The horizontal lug of this Angle Bracket is extended by a 1½ in. Strip 37. Journalled in the end hole of this Strip and in Corner Bracket 36 is a 9 in. Compound Rod, obtained from a 4 in. Rod with Keyway 38 and a 5 in. Rod 39, joined by a coupling. Free to slide on Keyway Rod 38, but prevented from turning by a Keyway Bolt, is a ⅞ in. Bevel Gear 40, while another similar Bevel Gear is fixed tight on Rod 39. Both these Gears mesh with respective Bevel Gears 30 and 31.

On the lower end of Rod 39 is fixed a ½ in. Pinion 41, spaced from Corner Bracket 36 by two Washers. This Pinion engages with a Worm on a 4½ in. Rod 42, held by Collars in the apex holes of two Trunnions bolted to Flat Plate 5. Also fixed on the Rod is another ½ in. Pinion that meshes with Worm 18 on 4½ in. Rod 17. Finally, a Power Drive Unit, fitted with a ¾ in. Sprocket Wheel on its output shaft, is bolted to the 5½ in. by 2½ in. Flanged Plate secured between Girders 6, and the Sprocket Wheel is connected by Chain to Sprocket Wheel 19.

All that now remains to be built are the entrance and exit guides for the wood, and these are by no means complicated. The former consists quite simply of a 4½ in. by 2½ in. Flexible Plate 42, attached to appropriate Angle Girders 1 by one right-hand and one left-hand Corner Angle Bracket, while the latter is supplied by a 3½ in. by 2½ in. Flanged Plate 44 attached to remaining Girders 1 by two 1 in. by 1 in. Angle Brackets. The Flexible Plate should be curved down slightly, as shown, and the model is finished.

A Super Model Rebuilt



Spanner gives today's advance model builders a chance to produce the gigantic Level-Luffing Automatic Grabbing Crane that was originally described in No. 35 of the world-famous series of Meccano Super Model Leaflets published before the last war.

ASK any die-hard Meccano enthusiast what he would most like to own, and I guarantee that a set of pre-war Super Model Leaflets would stand high in the list. These Leaflets, which must not be confused with the current series of Special Model Leaflets for Outfit No. 10, were published by Meccano Limited in the 1930s, and each one featured a large, highly-advanced construction.

The S.M.L.s, as they were called, proved enormously successful until publication ceased at the start of the war. Ever since then they have been in great demand, but Meccano have been totally unable to reintroduce them as all the blocks and printing plates used in their production were destroyed during the war, along with all existing stocks and even file copies. I, myself, do not have as much as one file copy, let alone a complete set! We do have a few of the original photographs used in preparing one or two of the Leaflets, but these are of little value today as the models illustrated use parts that are now obsolete.

Generally speaking, circumstances have combined to make what few copies of the Leaflets still exist into highly-prized collectors items. This fact, however, does not make the models, themselves, obsolete. On the contrary, they are as good now as they ever were, but, owing to our own lack of Leaflets, we have simply not been able to do anything about giving them a second showing until now, despite the number of requests from readers. It is only thanks to the personal collection of the Meccano Magazine's chief model-builder that we are now able to do something to rectify the situation. He, it turns out, has most of the old S.M.L.s and, while it is economically unfeasible for Meccano Limited to prepare new Leaflets, using the old ones as a basis, we see nothing to prevent us from building and featuring an occasional 'Super Model' in the 'M.M.'. Acting on our convictions, therefore, we feature below Super Model No. 35 Level-Luffing Automatic Grabbing Crane, slightly modified, of course, to enable current parts to be used where now-obsolete parts were fitted to the original.

Presentation Problems

You will see from the following text that I have departed from my usual practice of giving complete step-by-step building instructions. Unfortunately, this was unavoidable, as the enormous size of the model made such instructions quite out of the question, but I do not think any great set-back results. Anybody keen enough and with sufficient parts to build the model will, I feel, already be something of a Meccano expert and will not require complete instructions, provided good illustrations are included. This point is strengthened by the fact that the original S.M.L.s did not give step-by-step instructions.

The S.M.L., itself, posed another problem, however—should we completely rewrite the general instructions or should we simply reprint the S.M.L. text, changing only that referring to the slightly modified sections of the model? In the end we decided on the latter course, not, as you may think, because it appeared easier, but so that we could feature, as close as possible, Super Model Leaflet No. 35 in the Meccano Magazine for the historical interest of our readers. The following, including the out-of-sequence numbering, is the result:

Level-Luffing Automatic Grabbing Crane

In the ordinary type of crane a considerable amount of power is necessary to raise the jib on account of its weight and the effect of the load. How the load affects the operation may be easily demonstrated by means of a Meccano crane. If the jib is luffed in and out with the hoisting barrel 'braked', the load will be found to rise and fall also, so that power has to be expended in this direction as well as in lifting the dead-weight of the jib. In practice this means an increase in running costs, especially in the case of cranes engaged in the handling of ships' cargoes, etc., where it is necessary to luff the jib almost continuously.

In order to eliminate some of this waste of power, many cranes are fitted with balanced jibs and level-luffing gears. The balanced jib gets over the difficulty of the dead-weight of the jib, and the level-luffing gear counteracts the effect of the load by making the crane hook maintain always the same height above the ground whilst the jib is being luffed. Hence the luffing motor only has to overcome friction, so that the motor can be of much lower power than is necessary with the ordinary non-compensated crane. Also it will be readily appreciated that the driver can handle a load with a much clearer conception of its path when it follows a horizontal course instead of a constantly varying one.

One of the simplest and most efficient balanced-jib level-luffing systems and one, therefore, that goes a long way to reducing running and maintenance costs, is the 'Toplis' gear, which is the type reproduced in the Meccano model. In order to make matters quite clear to the reader we show in Fig. 12 a line drawing of the layout of the 'Toplis' gear. The hoisting rope passes up from the hoist barrel to a pulley in the superstructure head B. From here it passes round one of the pulleys at the jib head A, back round the remaining pulley at B, and lastly over the second pulley at A, and so down to the load.

Now point B is at such a distance above the jib pivot that when the jib head A rises through, say, 3 in., the distance AB decreases by 1 in. Owing to the fact, however, that there are three falls of the hoisting rope passing between A and B, the shortening of the distance AB by 1 in. means that the end of the rope to which the hook is attached is paid out 3 in. Hence the load remains level throughout the entire luffing range.

Another common feature of most cranes is that the jib is luffed by a rope or ropes that are wound upon a barrel; but in the case of the prototype of the Meccano model, the jib is luffed by means of a system of cranks and links, and this method of operation is reproduced accurately in the model. It holds several important advantages over the usual system. For example, limited switches and their attendant gear are rendered unnecessary, since it is obvious that with the crank-operated jib it is impossible to over-luff. Another advantage of equal importance is that the motion of the jib reaches a maximum speed round the middle of the luffing range where it can safely be used, and falls off rapidly to zero at either end. Luffing ropes have the great disadvantage that they require overhauling periodically, and there is always the possibility of breakage. With the crank-operated system these defects are eliminated.

The Meccano crank-operated level-luffing grabbing crane that forms the subject of this leaflet demonstrates in a truly remarkable manner the features of an actual crane of the type in question.

Construction of the Meccano Model

The construction of the model should be commenced by building the gantry. This is of massive construction, for it has to support a very heavy load. A glance at Figs. 2 and 3 will show that the four main supporting Girders 1 are each composed of a 12½ in. Angle Girder and two 12½ in. Strips, bolted together so as to give an 'L' Section to the Girder, which is one of the shapes best calculated to resist effectively the crushing or compressive stresses to which these members are subjected. The bottom of the Girders are attached near the ends of the Girders 2, in which the Road Wheel Axles are journalled. Each Girder 2 consists of two 12½ in. Angle Girders bolted together to resemble in section the letter 'T'—a form that easily resists the stresses set up in this part of the structure. Corner Gussets are employed to strengthen the connections between the Girders 1 and 2.

It will be realised that the top cross Girders or 'beams', to which the 9⅞ in. diameter Flanged Ring forming the lower portion of the built-up roller race is bolted, are subjected to severe downward-acting bending stresses due to the weight of the crane proper. Consequently, each beam consists of a 9½ in. Angle Girder to the downward flange of which is secured a Flat Girder of similar length. This construction, by strengthening the flanges, reduces the tendency of the lower edges of the Girders to tear asunder. The above-mentioned lower section of the roller race is built up from a 9⅞ in. diameter Flanged Ring to which two 9½ in. Strips are fixed at 90 degrees to each other. Four Single Bent Strips are attached to the vertical flange of the Flanged Ring, as shown.

Having reached this stage of the construction, it will be found that the gantry is still far from rigid in spite of the strength of its main members. In fact, if the base be held firmly, it is possible to push the top horizontally in nearly every direction. This defect is due to a lack of strength at the corners, and in order to obtain the required rigidity it is necessary to add to the structure diagonal corner 'ties'. The various ties in the model take the form of Strips. As in the actual crane, the forces at work are always pulling on the ends of the ties in the model, and each tie is pulling against its neighbour, or an opposing external force, so that it may be said that a continual tug-of-war is taking place, in which neither side gains the advantage, unless a bolt pulls out or a tie breaks!

The Idler Travelling Wheels are secured to Rods that are journalled in the slots of the Girders 2 so that they are free to rise and fall therein, but the Driving Wheel Axles are journalled in Strips that are bolted over the slots of the Girders. In this manner the whole weight of the model is thrown on to the Driving Wheels, so ensuring proper adhesion of the Wheels on the rails.

The arrangement of the drive to the Travelling Wheels is identical on each side of the gantry, and the construction is as follows. A Rod 7 carries on its end a ⅞ in. Bevel, which is in mesh with a similar Gear on a 1 in. Rod that is journalled in 2½ in. Strips 3 and in a Coupling 5 on the Rod 7. The Coupling is, of course, quite free on the Rod, and the 2½ in. Strips 3 (which are trebled for strength) are bolted across a 9½ in. Flat Girder 10. The latter is attached to 4½ in. Angle Girders that are secured to the top flanges of the Girders 2.

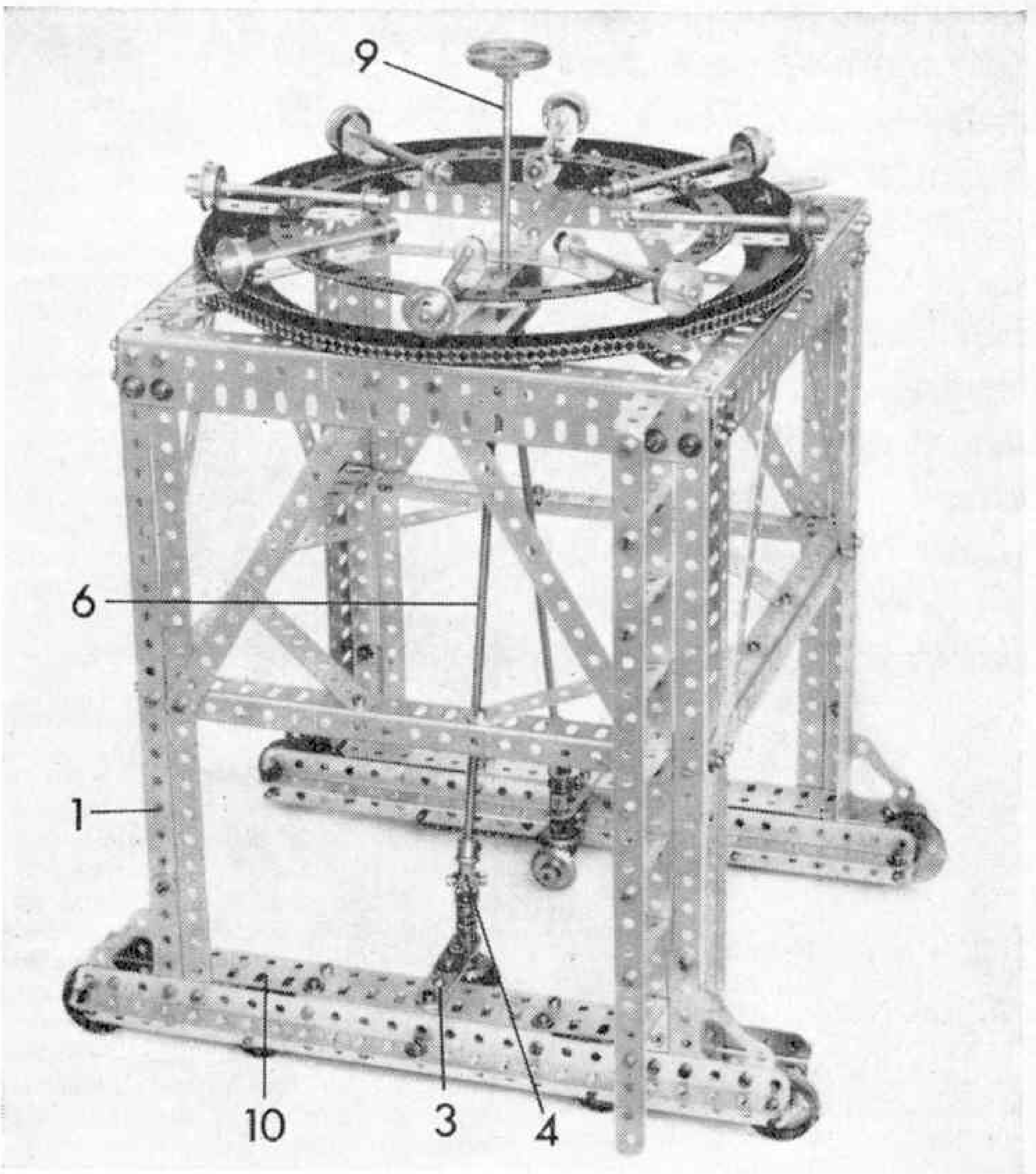
The other end of the 1 in. Rod is fitted with a Universal Coupling 4, and this is connected by an 8 in. Rod 6 to a further Universal Coupling. The latter, in turn, is secured to a Rod that is journalled in a 2½ in. by 1 in. Double Angle Strip and in one of the 9½ in. Strips bolted to the Flanged Ring and carries a ½ in. Pinion above the Double Angle Strip. The Double Angle Strip, itself, is attached to the same 9½ in. Strip by Trunnions. The Pinion is in constant mesh with a second Pinion which is secured to a Rod 9 (Fig. 4) that will pass completely through both the upper and lower portions of the roller race when the model is assembled. It will be seen that by rotating the Rod 9, the Rods 7 are both driven at the same speed via the train of three ½ in. Pinions, the universally-jointed Rods 6 and the ⅞ in. Bevels. The drive is transmitted finally to the wheels by Sprocket Chain, which passes over ¾ in. and 1 in. Sprocket Wheels secured on the Rods 7 and the Wheel Axles. Before laying the gantry aside and continuing with the construction of the model, it is important to see that the transmission works as freely as possible. Bearings and gears should be oiled lightly, and small adjustments made if necessary with this end in view.

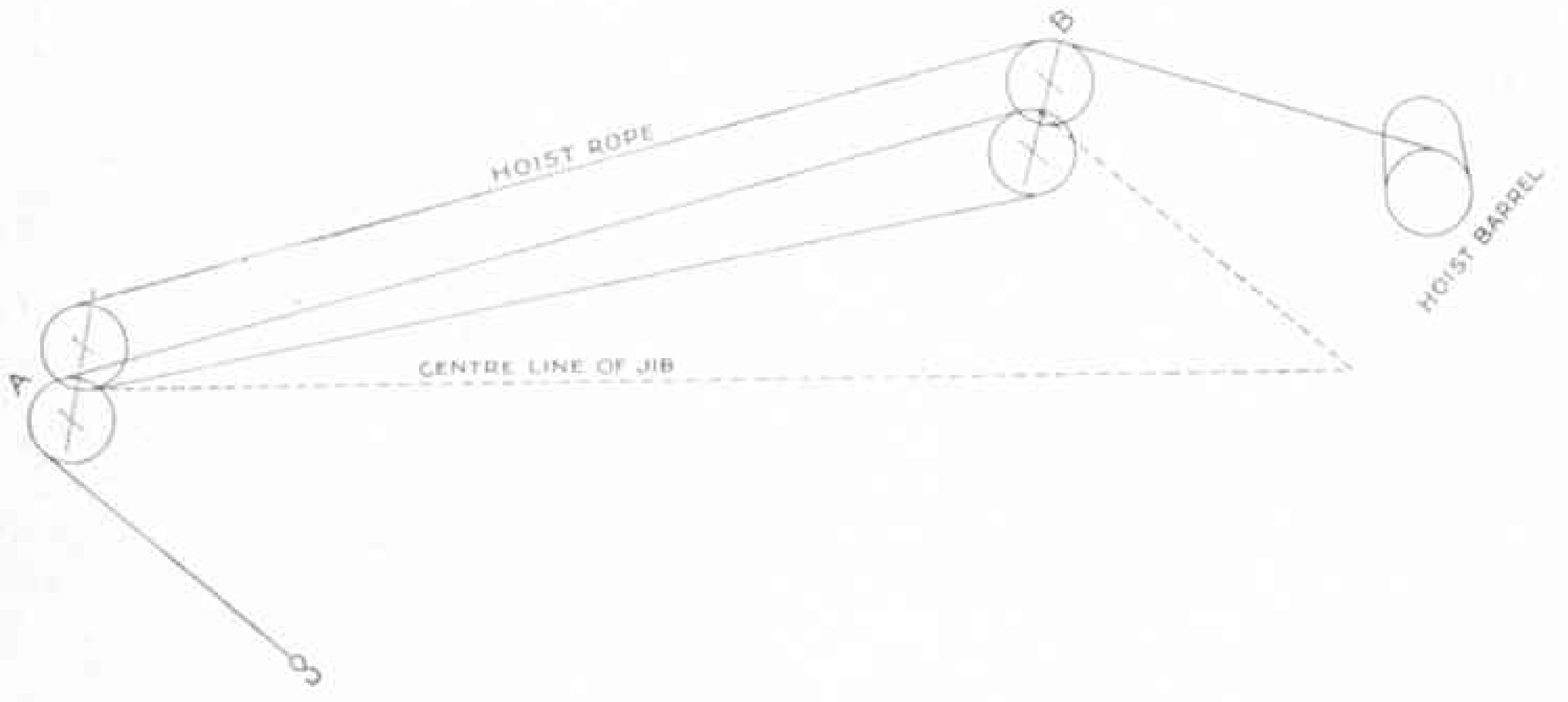
The Swivelling Superstructure

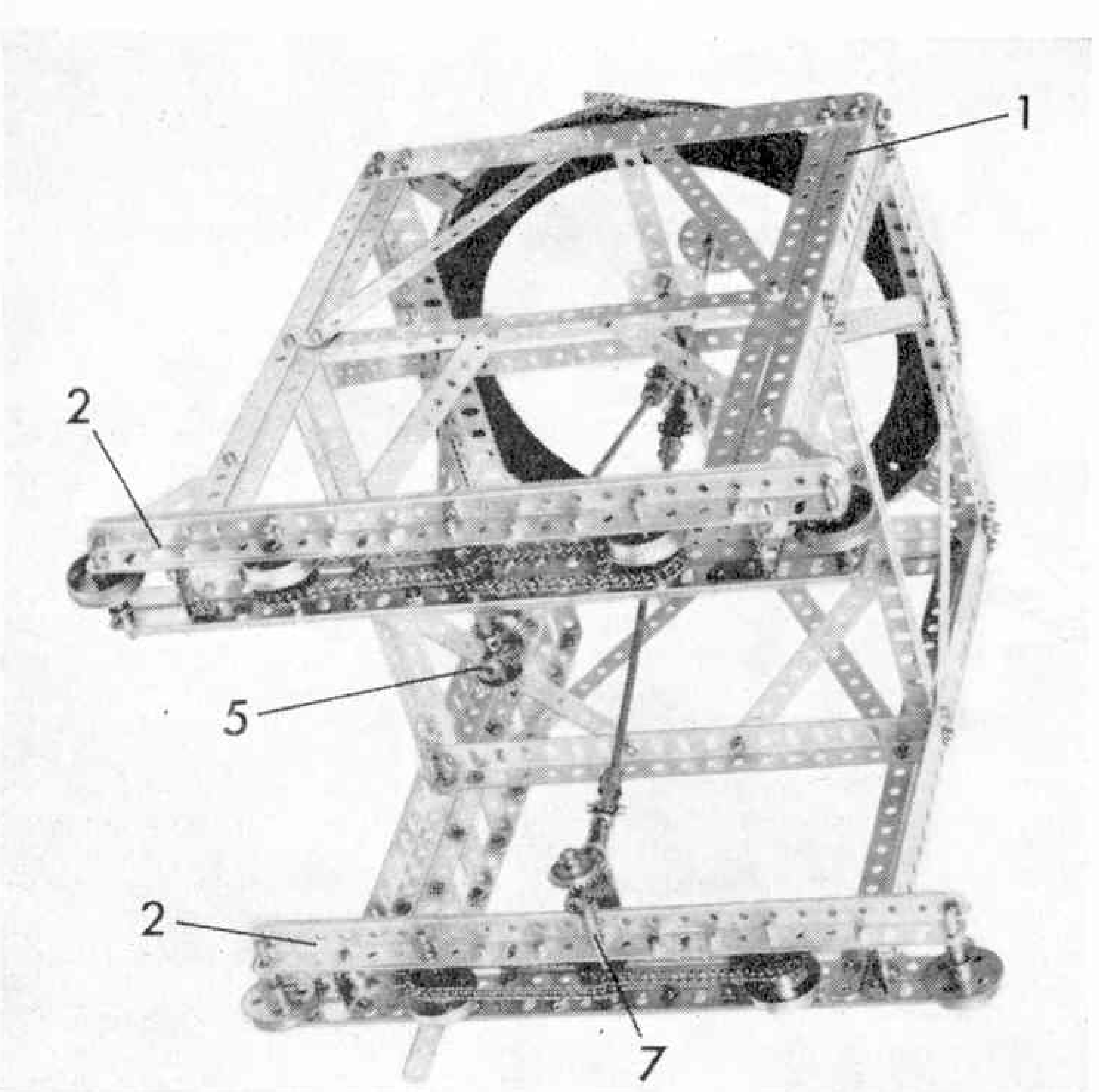
As will be seen from Fig. 4, the swivelling superstructure is built upon the upper portion of the roller race. (The accompanying illustration is one of the original photographs and shows the superstructure built onto the Toothed Disc of pre-war Part No. 167 Roller Race. In today's model this part is replaced by a second 9⅞ in. diameter Flanged Ring attached to Angle Girders 11 by 1½ in. Angle Girders. These are bolted to Angle Girders 11 on the inside and are then secured by one Nut and Bolt to the Flanged Ring. The two 5½ in. by 2½ in. Flanged Plates shown in the illustration still remain and are fixed to the Flanged Ring by a 3½ in. Angle Girder, the securing Bolt also holding one end of a 9½ in. Strip to the Flanged Ring. At its other end, this Strip is bolted to the Flanged Ring in the diametrically opposite position.) The vertical 12½ in. Girders 13 comprising side members of the tower are attached to 5½ in. Angle Girders on the side Girders 11, and the points of attachment are strengthened by means of Corner Brackets.

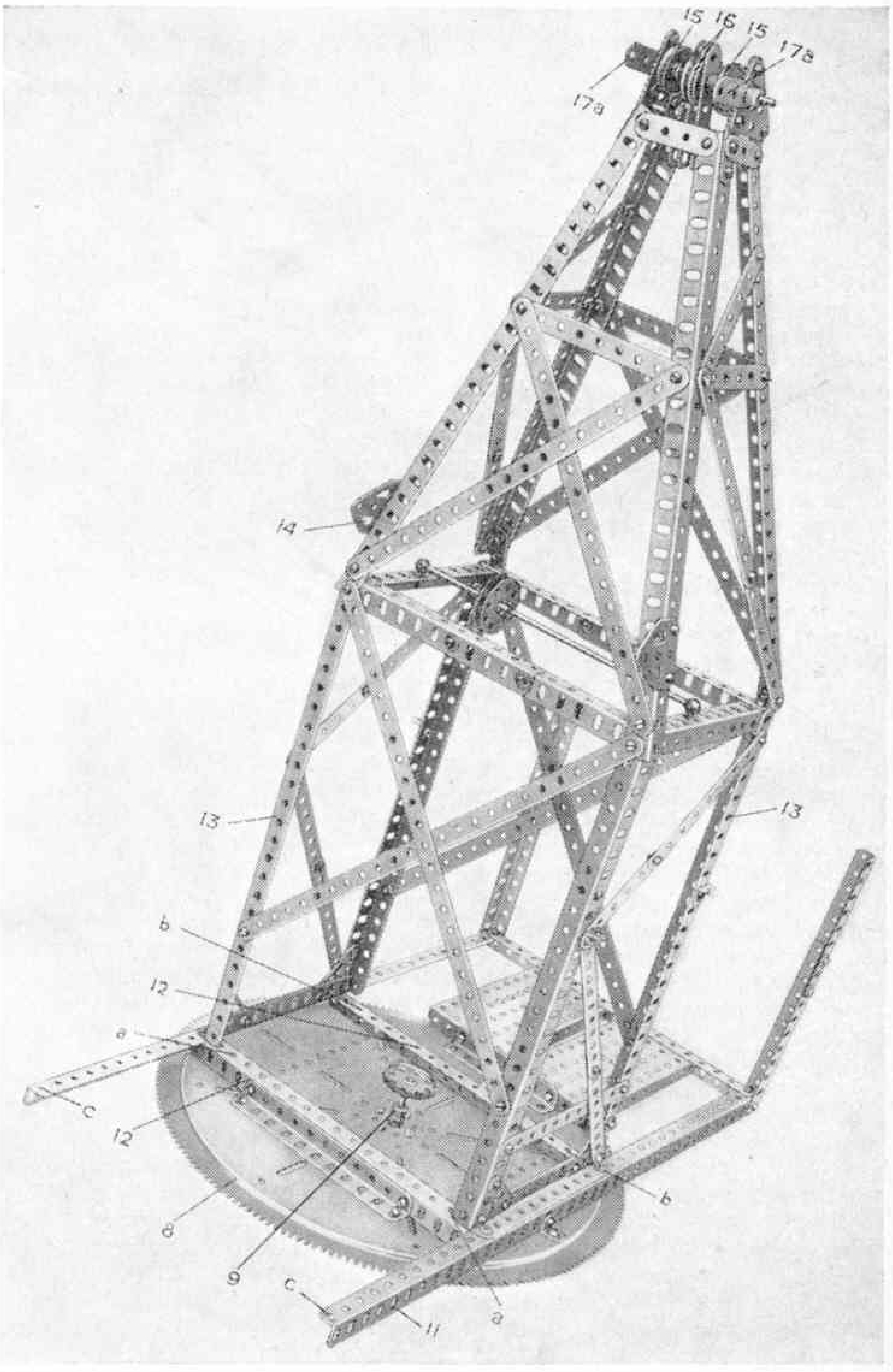
The Pulleys 15 and 16 and the 1½ in. Strips 17a are mounted loosely on a Rod that is journalled in Corner Brackets at the top of the tower, to which they are attached by 2½ in. Strips and Fishplates. The Pulleys 15 are 1 in. fast Pulleys, which are spaced from the centre pair (1 in. loose Pulleys) by Collars and Washers, and guards, to keep the hoisting cord in the grooves of the Pulleys 16, are formed from 2½ in. Strips. Suitable bracing is added to the tower as indicated in the illustration. The construction of the gear cabin should be fairly clear from the general view, with the exception of the roof, which is composed of three 5½ in. by 2½ in. Flanged Plates and one 5½ in. by 2½ in. Flat Plate. The rear portion of the cabin is left uncovered in order to show the internal construction more clearly, but if desired 9½ in. by 2½ in. and 12½ in. by 2½ in. Strip Plates can be used for filling-in purposes. At certain points these Plates should be made easily detachable.

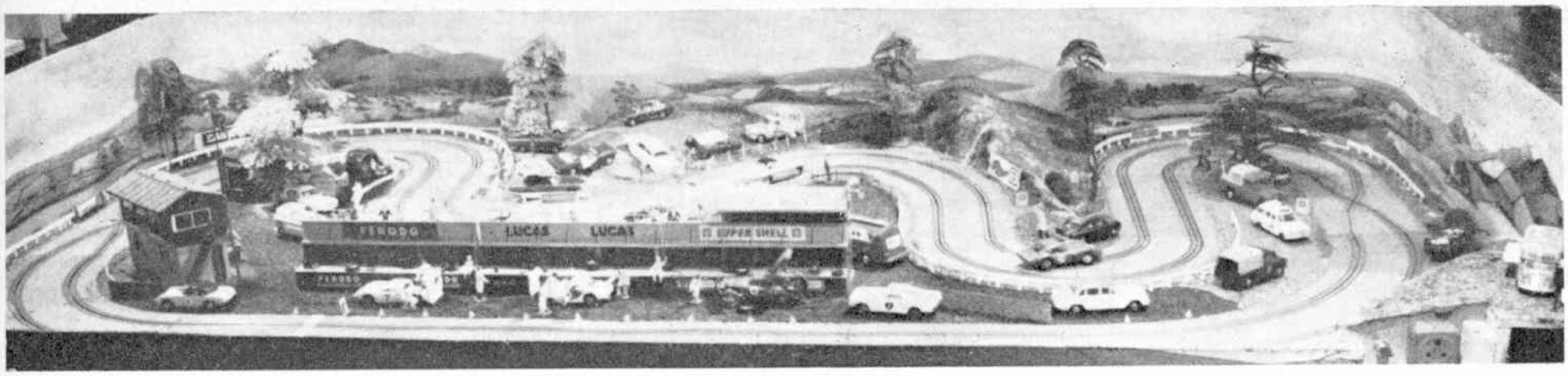
Next month: The Construction of the Jib, Gearbox and Grab.





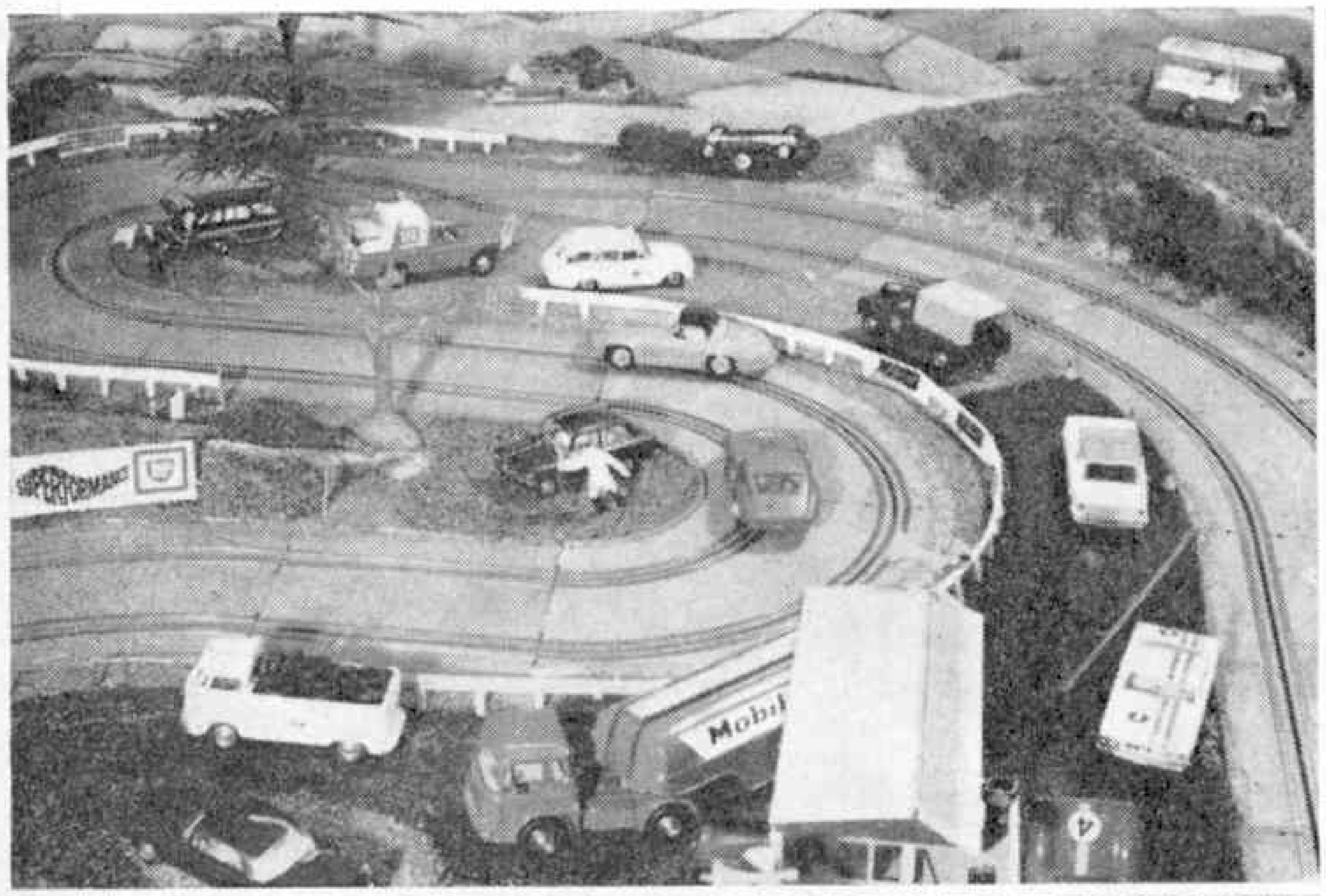


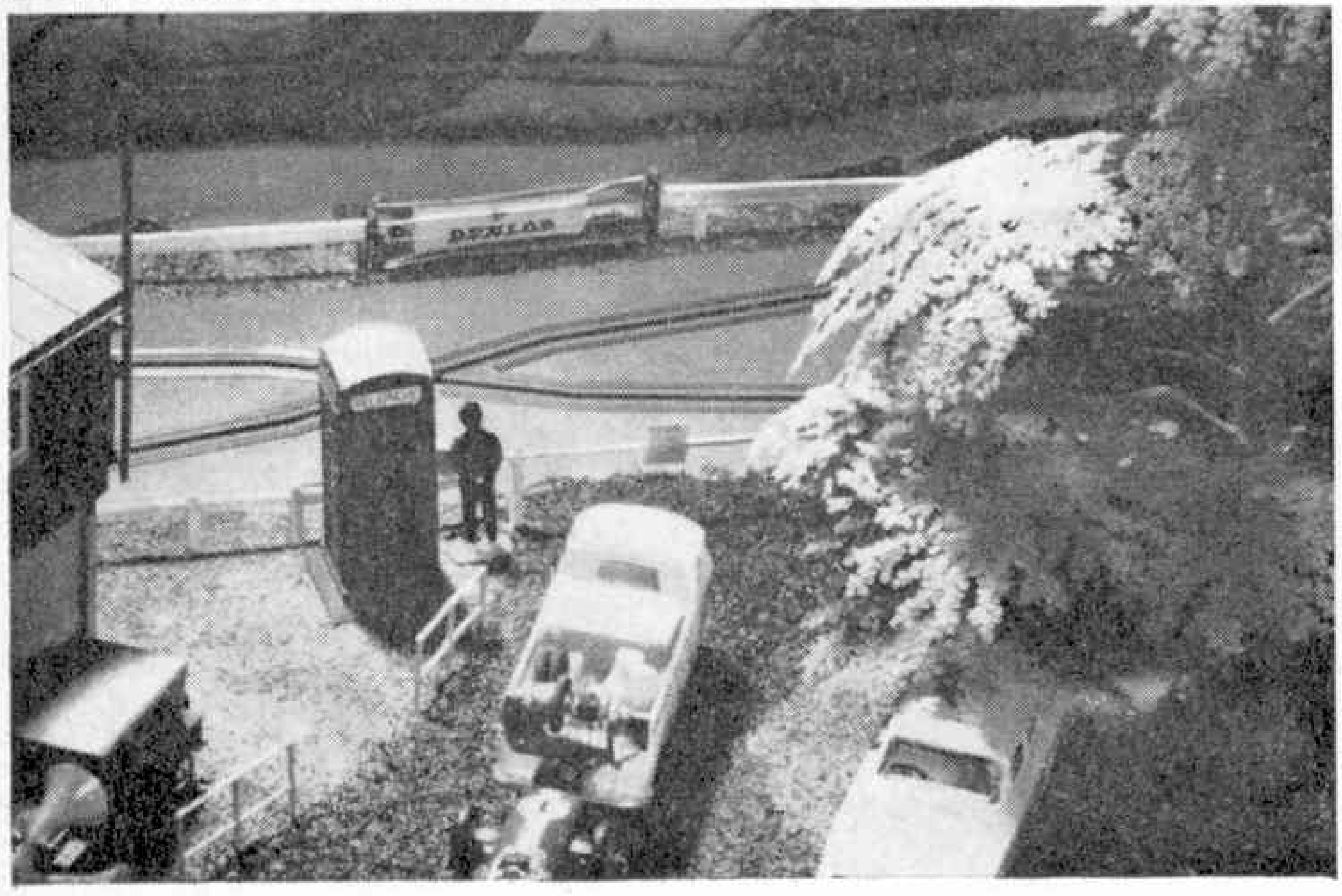




Building a Permanent Circuit

In the past five issues of M.M. Godfrey Arnold has described the step-by-step construction of his small, but fully equipped racing circuit. This month, we thought you would like to see some photographs of the finished job, and we think you will agree that the layout is very effective indeed—especially as it is accommodated on a baseboard measuring only 6′ x 3′. Realistic background scenery and clever use of figures and fences all contribute to the overall effect. Next month, Godfrey Arnold describes how he built a GP Lotus 24, using an Airfix body and front axle and a Scalextric Race-Tuned motor and rear end.

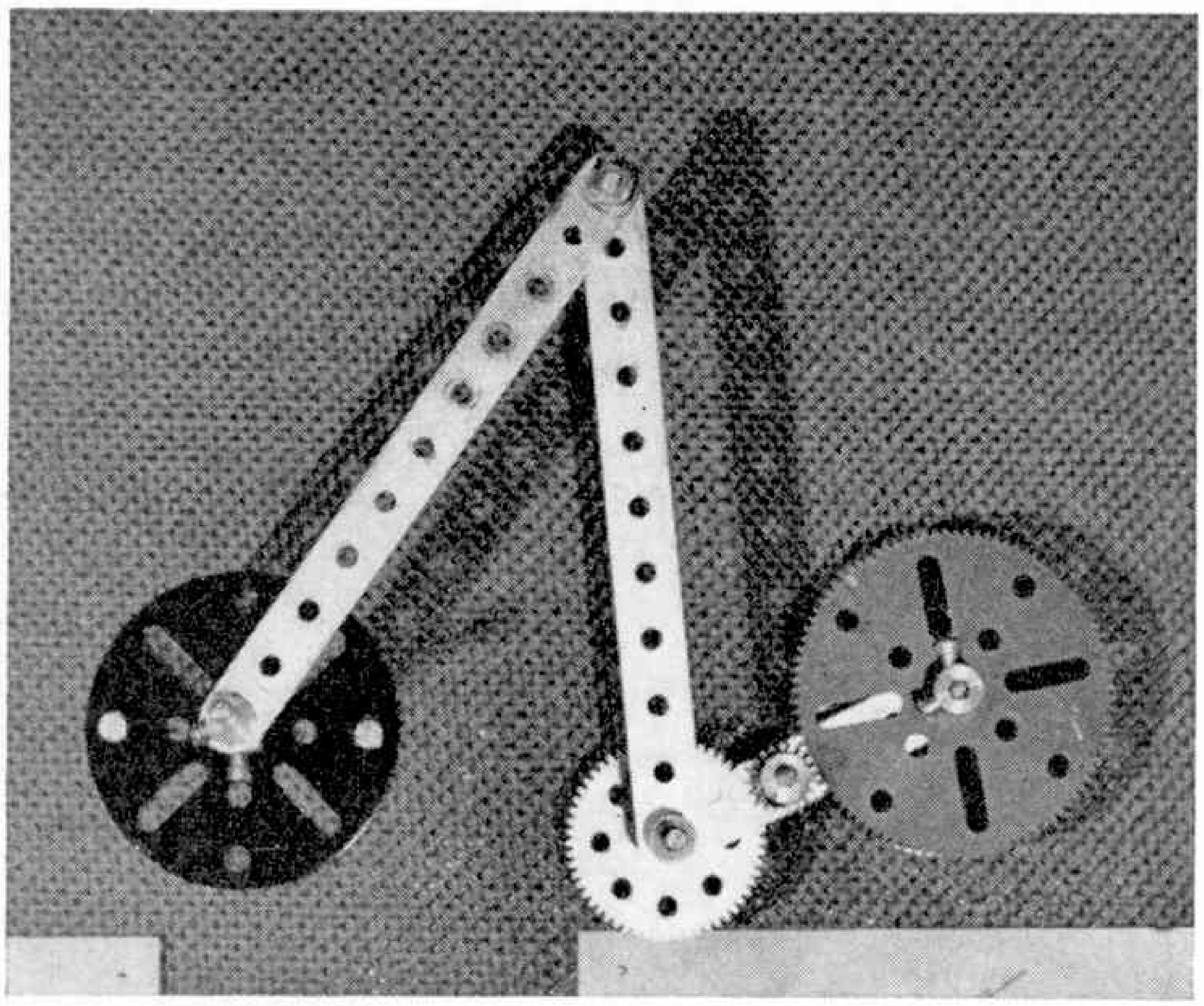


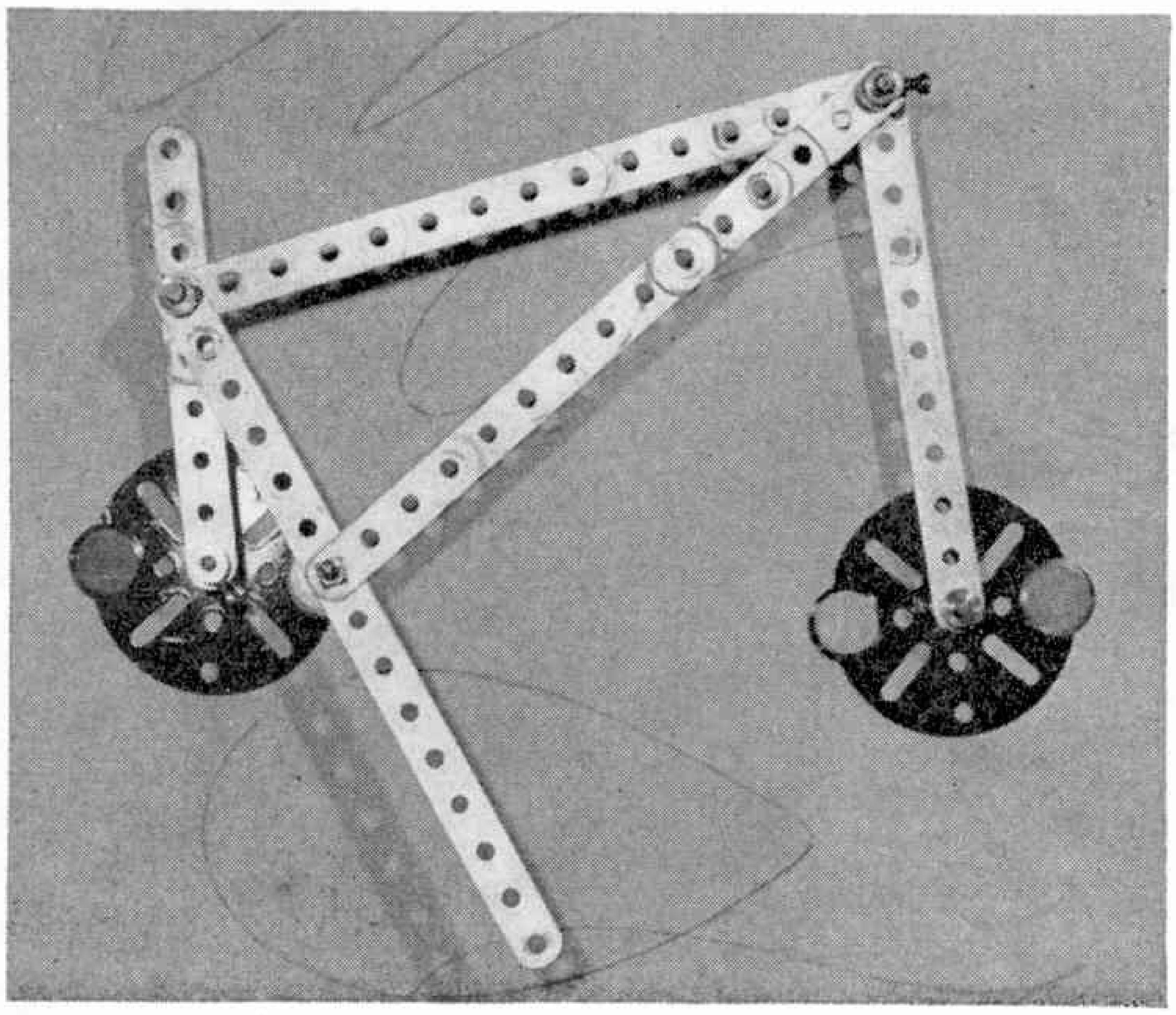


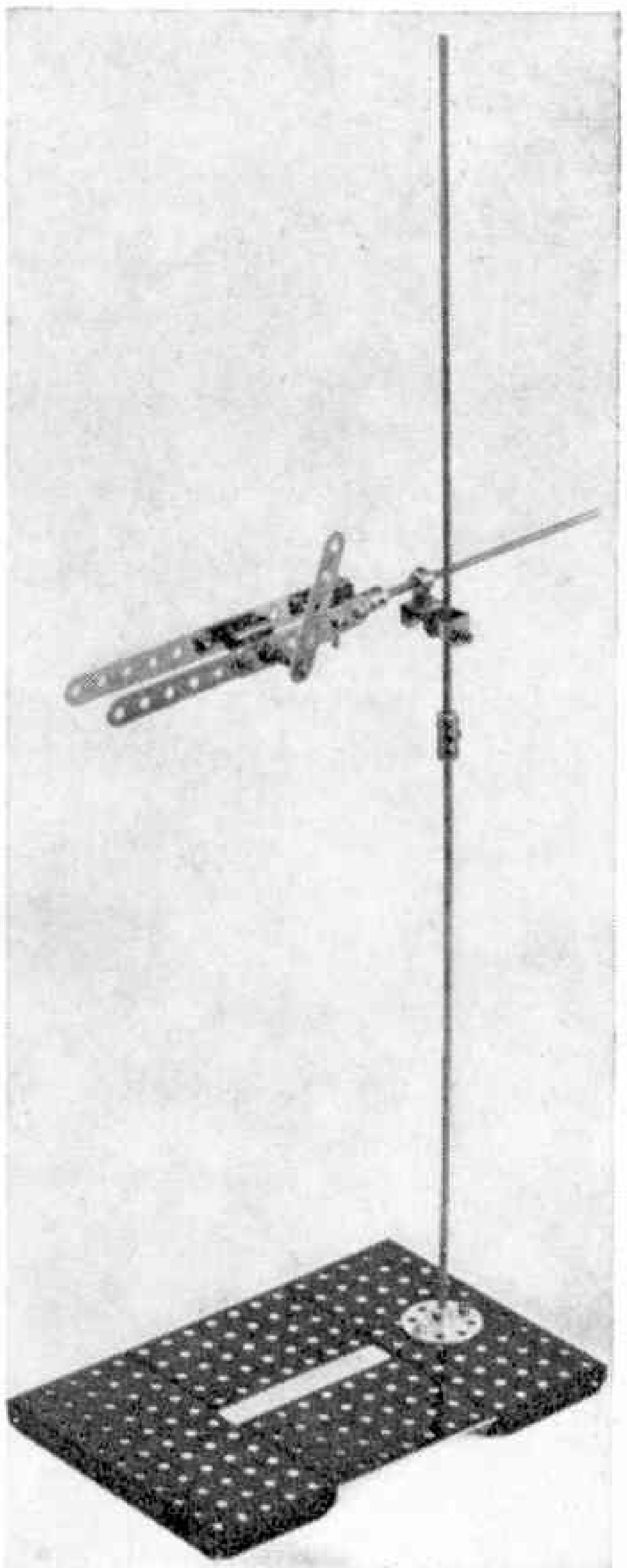
Among the Model Builders with 'Spanner'

IN this month's article, we include a number of interesting suggestions sent to us by readers over the past few weeks. One of these is the result of the August 1966 'Among the Model Builders', in which was published a Clamp Stand built by Mr. S. W. Wright. Although this undoubtedly has its uses, Mr. Nigel Adams of Sedgley, Worcestershire, has made an improved version which includes a clamp that can be screwed and also tilted to any angle. The clamp built by Mr. Wright was of the fixed type and could not therefore be adjusted. Mr. Adams' version also differs by having a much larger base, which of course makes the unit more stable when the clamp is positioned at the top of its stand.

Its base is built from two 5½ in. by 2½ in. Flanged Plates and two 3½ in. by 2½ in. Flanged Plates bolted to each other to give an area of 8½ in. by 5½ in. At the end of one of the 5½ in. by 2½ in. Flanged Plates is bolted a Bush Wheel in which is mounted an 11½ in. Axle Rod 1, with a Coupling 2, joining on to a further 11½ in. Axle Rod 3. The clamp is joined to the upper Axle Rod by two Double Angle Brackets bolted together with a ¾ in. Bolt 4, which also screws on to a Collar 5, mounted on the Axle Rod. The Angle Bracket 6, also holds the Collar on to the Rod and nuts are positioned on either side of the Collar and the Bracket. A Bolt is pushed through the upper hole in Angle Bracket 7, and two Nuts are screwed on so that Collar 8, can be screwed on top. Through the hole in the Collar is a 6½ in. Axle Rod 9, the end of which has a Coupling 10. On this is bolted a 5½ in. Strip 11, which is strengthened by a 2½ in. Strip. A Double Bracket 12, is screwed to the opposite side of the coupling by the same bolt that holds the 5½ in. Strip in position. Another Double Bracket 13, is fitted around the first one and before this is fixed in position, a 5½ in. Strip 14, is bolted to it and a Collar fixed on to the end of the screw. The Collar lies inside the cube formed by the two Angle Brackets and the screw holding the first 5½ in. Strip to the Coupling is also used for holding one side of the Collar. The second 5½ in. Strip also has a strengthening 2½ in. Strip bolted to the outside and a 1½ in. Axle Rod 15, is pushed through the upper and lower holes of the outside Double Angle Bracket and also, of course, through the hole in the coupling. The screws may then be tightened up. To allow the clamp to be tightened, a Coupling 16, is screwed at one end only to the inside of the second 5½ in. Strip and a 3 in. Screwed Rod 17, with two Nuts tightened approximately one-third of the way down, is then passed through the hole of the first 5½ in. Strip and screwed through the end of the Coupling. A 2½ in. Strip is then fixed on the outside end of the 2½ in. Rod, to act as a handle.







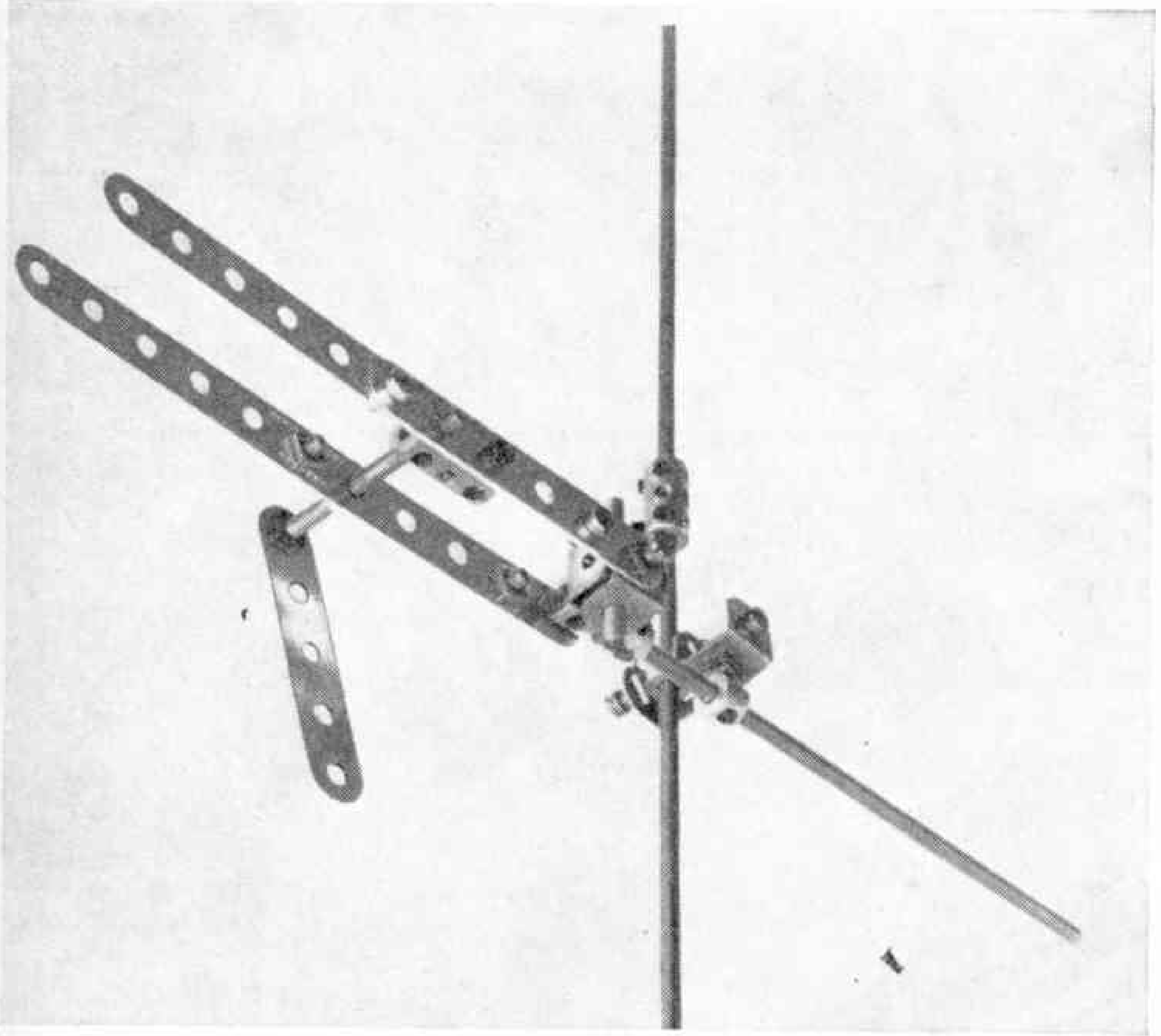
The second suggestion comes from Mr. A. G. Gamble of Lenton, Nottingham, who has devised a new type of bearing for the dragline model illustrated on Special Model Leaflet 9/4. Mr. Gamble had the idea for this from the bearing on an actual breakdown crane, and the principle by which it works, is that the moving outer ring is retained by the 'V' groove in the 6 in. Pulley. The centre, which is fixed, consists of a 6 in. Pulley (19C) strengthened by a Hub Disc (118) bolted at the extremity of its spokes to the Pulley. The moving outer ring is made from two 7½ in. diameter Circular Strips (145) between which five pairs of Wheel Discs are held on ¾ in. Bolts spaced from each Circular Strip by one Washer on either side. The remaining three are Single Discs spaced by a Washer on one side and two on the other. This arrangement of Wheel Discs gives a minimum of play and the bolts holding these are lock-nutted. A useful improvement to an otherwise good model.

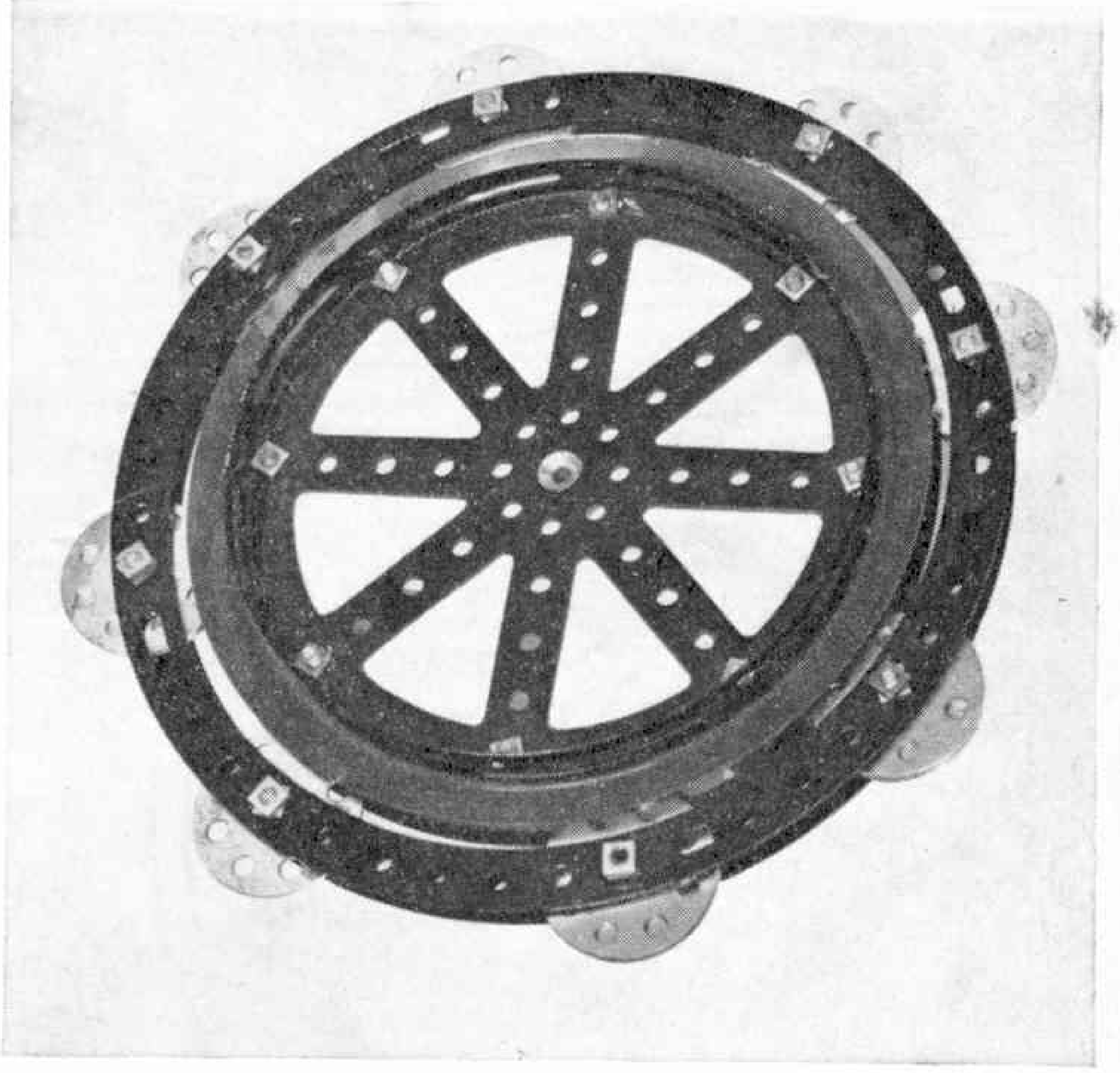
Meccano is now aiming into increasing use at the Liverpool College of Technology where research is undertaken into kinematics—the science of the essential movements of all mechanisms. First used in the college in a small way to make two or three basic models, Meccano is now becoming more popular both as a teaching aid and as a research tool.

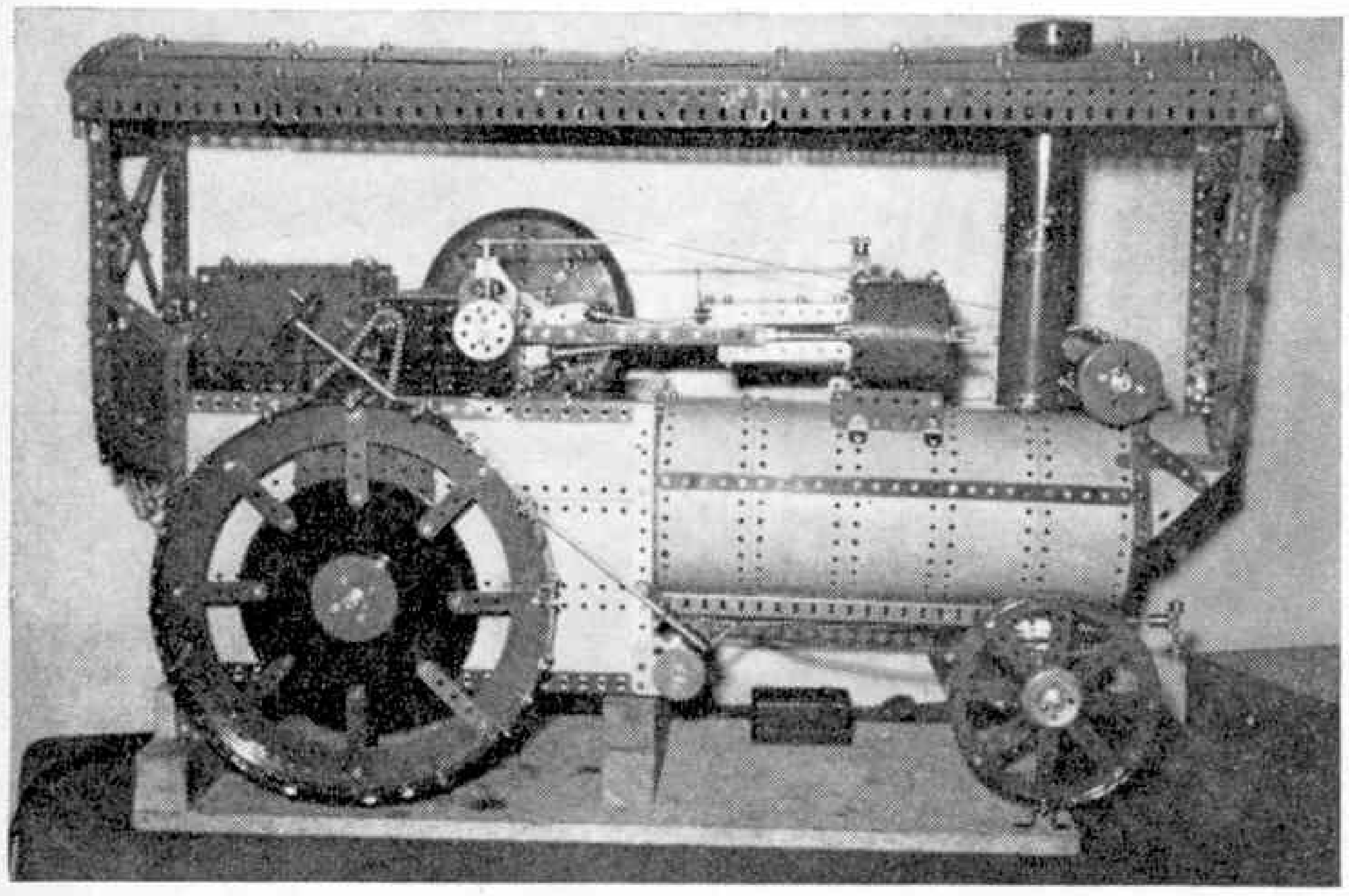
Most real machines, even very complicated ones, can be represented mathematically as being built up of a series of simple links. The links are joined together so that each can move relative to its neighbour either by sliding (e.g. Piston), turning (e.g. Crank) or rolling (e.g. Gears). Simple Meccano bars or rods can be used to construct a model which may not appear very much like the original mechanism, but in fact reproduces all its essential, mathematical features. This model has two very big advantages for the kinematician. Firstly, it demonstrates the movement in a very clear way, without all the complex shapes and 'bits and pieces' on the real machine. Secondly, the link lengths can be changed very quickly in the Meccano model by just choosing a different hole in the strip, or by using a different rod length. This enables the best possible shape of a mechanism to be decided very easily.

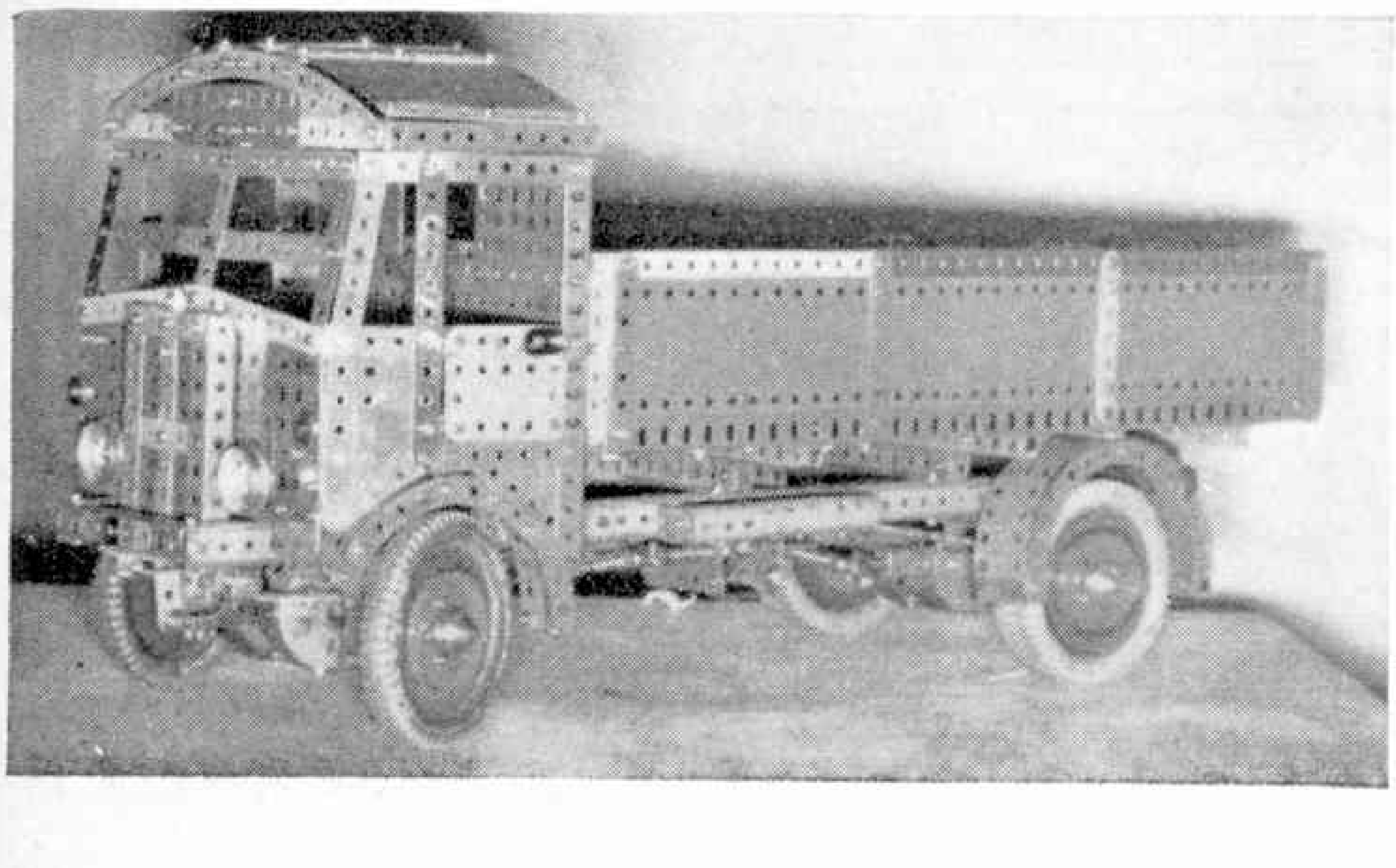
Because they can be readily built up and changed, kinematic models are being used more and more in class. Students learn to analyse velocities, accelerations and so on for real machines and a model which actually reproduces the motion they are analysing, gives good appreciation of 'feel' for the problem.

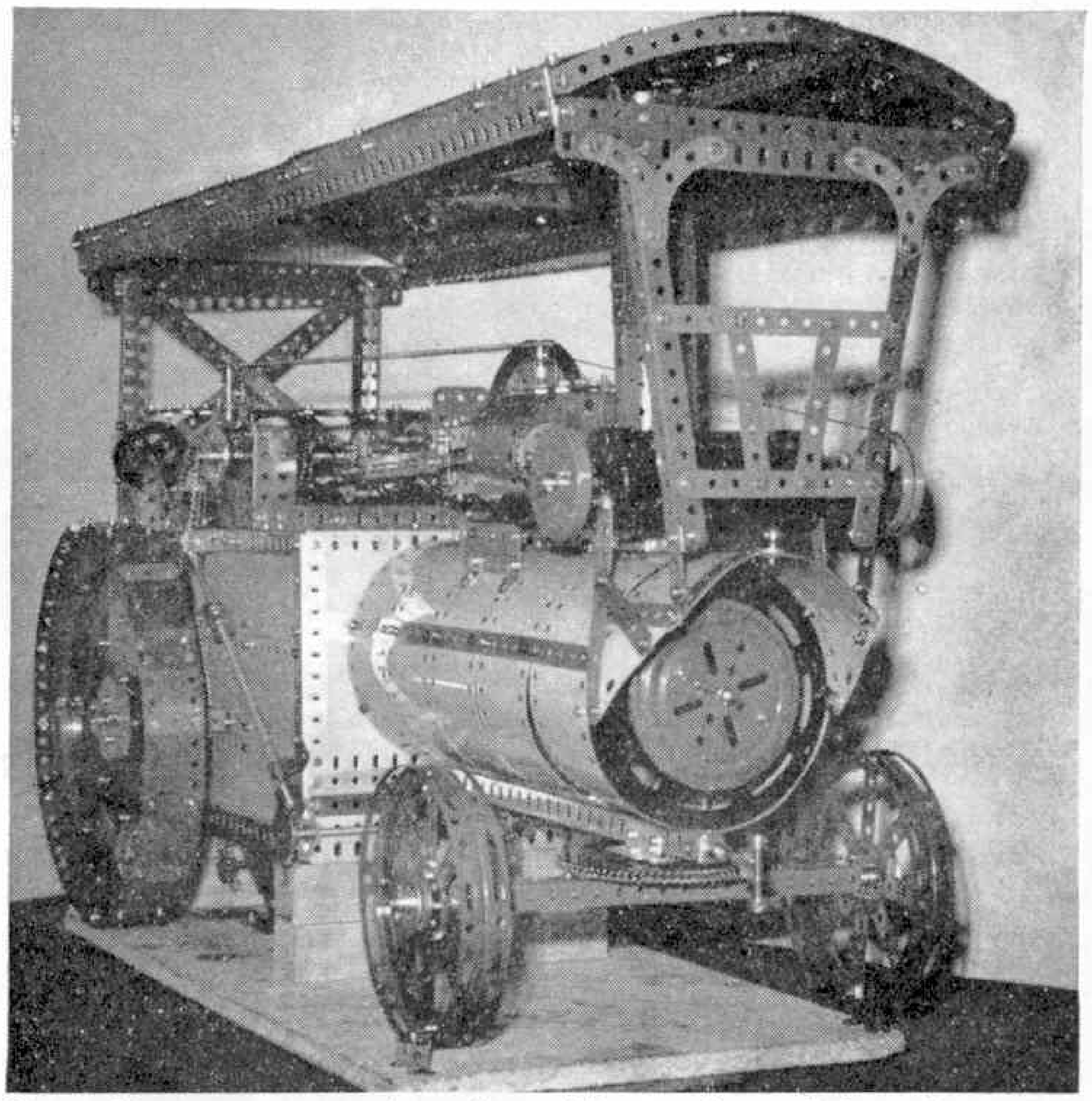
Even more interesting is the application of Meccano in research. Here 'new' mechanisms have to be analysed to find out if their movement, often very complex, can be used to solve a particular problem. All the link lengths, angles, gear ratios, etc., have to be changed and the effect of the changes noted. One way this was done was by programming a digital computer to analyse the motion and then plotting graphs for each particular size of link, gear, etc. However, it was found to be quicker to make up a Meccano model and note the effects of changing the lengths, etc., of its members. Any particularly interesting result can then be analysed accurately on the computer. Using the models, therefore, saves time-consuming hand plotting of graphs as well as giving a physical realisation of how the mechanism moves. The computer will not replace Meccano for this job until it can either show a moving picture of the mechanism, or make its own model, and both of these are still quite a long way off.











Opposite page: examples of two kinematic models and general view of Mr. Adams' adjustable clamp stand. Above: close-up detail of the clamp stand, A. G. Gamble's new type of bearing for a dragline, and two Meccano favourites—a showman's tractor and heavy lorry

T.N.T TIM
AND HIS NEW
WAYFINDERS ADVENTURE BOOTS
MY BABY!
A GIGANTIC FOX HAS BEEN TERRORISING THE COUNTRYSIDE... AND THEN ONE DAY....
DON'T WORRY-I'LL FIND HIM!
BUT THAT'S IMPOSSIBLE!
NOT WITH MY NEW WAYFINDERS BOOTS IT ISN'T!
TIM CONSULTS THE ANIMAL TRACKS ON THE SOLES OF HIS NEW WAYFINDERS, AND AT ONCE PICKS UP THE TRAIL.
BADGER
STAG
GOAT
RED SQUIRREL
HEDGEHOG
STOAT
FOX
SHEEP
WAYFINDERS
THESE ARE FOX TRACKS ALL RIGHT!
GUIDED BY HIS 'WAYFINDERS BOOTS, TIM TRAILS THE FOX DEEP INTO THE WOODS!
MEANWHILE AT THE FOX'S DEN...
THE VICIOUS BEAST IS ABOUT TO POUNCE... WHEN SUDDENLY...
OH NO YOU DON'T!
WITH A BLOOD-CURDLING SNARL— THE FOX SPRINGS AT TIM .....
GET A MOUTHFUL OF THAT!
THE STURDY LEATHER OF HIS WAYFINDERS PROTECTS TIM'S ANKLES.. AND THE FOX CRAWLS AWAY WITH AN ACHING JAW!
NOW TO GET BACK—THE COMPASS IN THE POUCH ON MY WAYFINDERS WILL GUIDE ME.
LATER
DON'T THANK ME. THANK MY NEW WAYFINDERS BOOTS I COULDN'T HAVE DONE IT WITHOUT THEM.
HOW CAN I EVER THANK YOU?

NEW

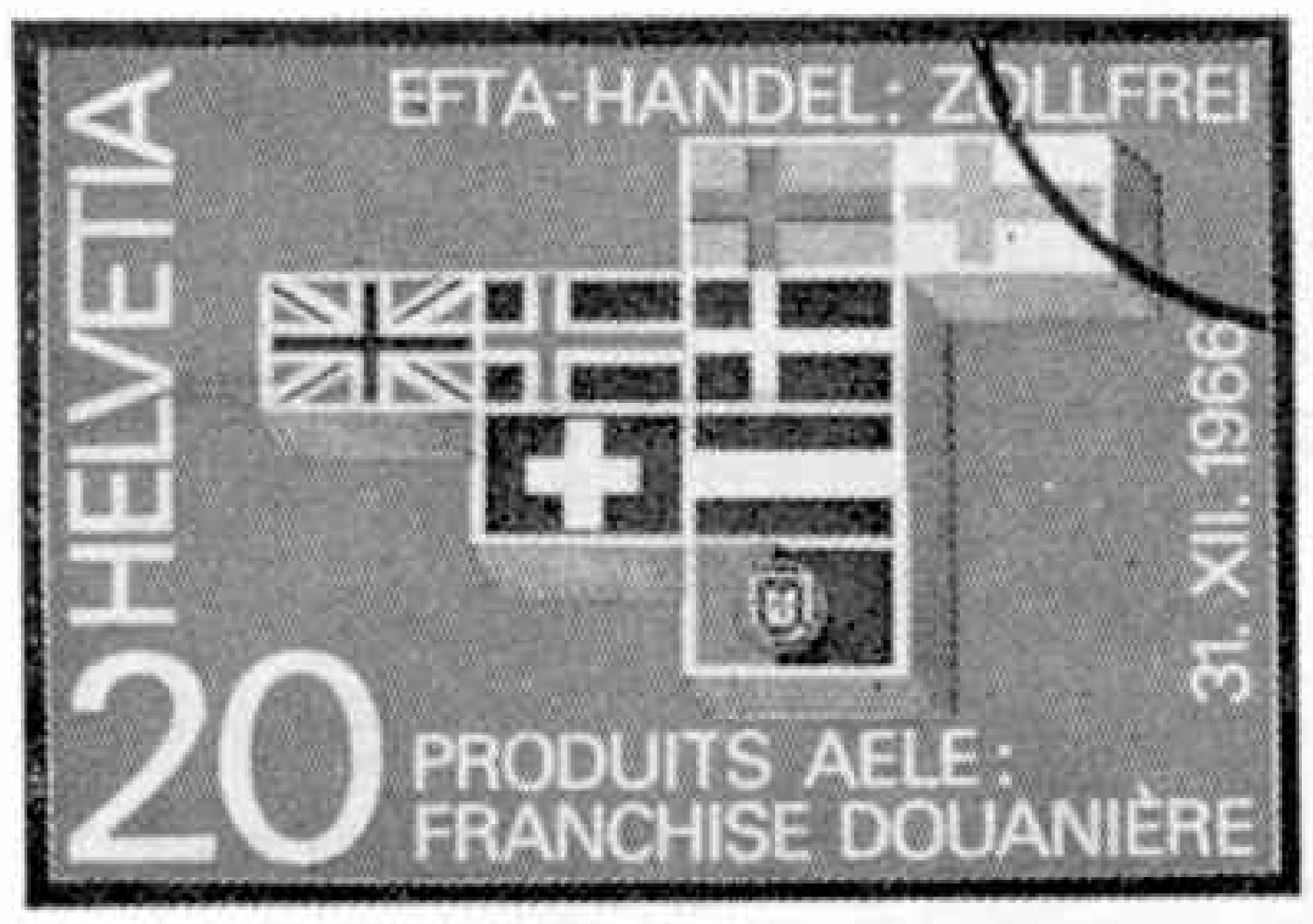
WAYFINDERS BOOTS

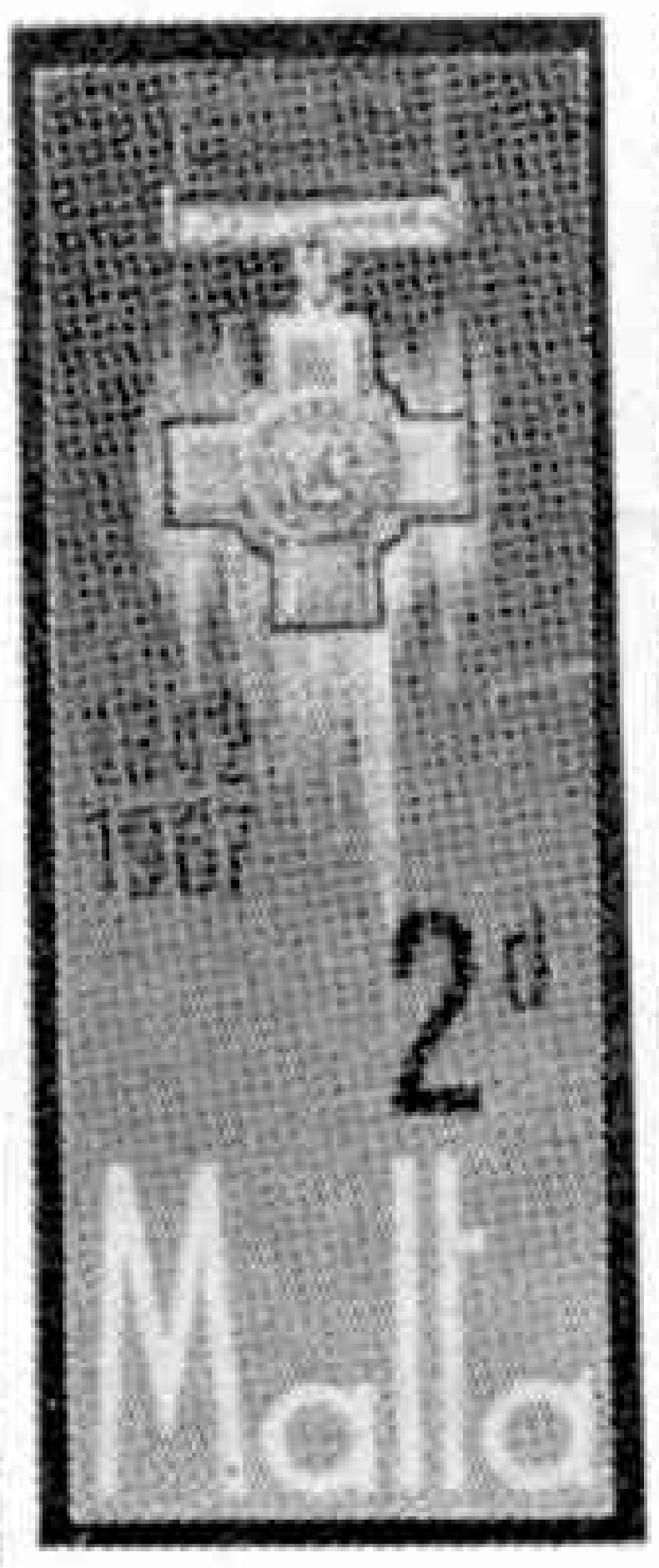
ARE BUILT FOR THE TOUGH ADVENTUROUS LIFE

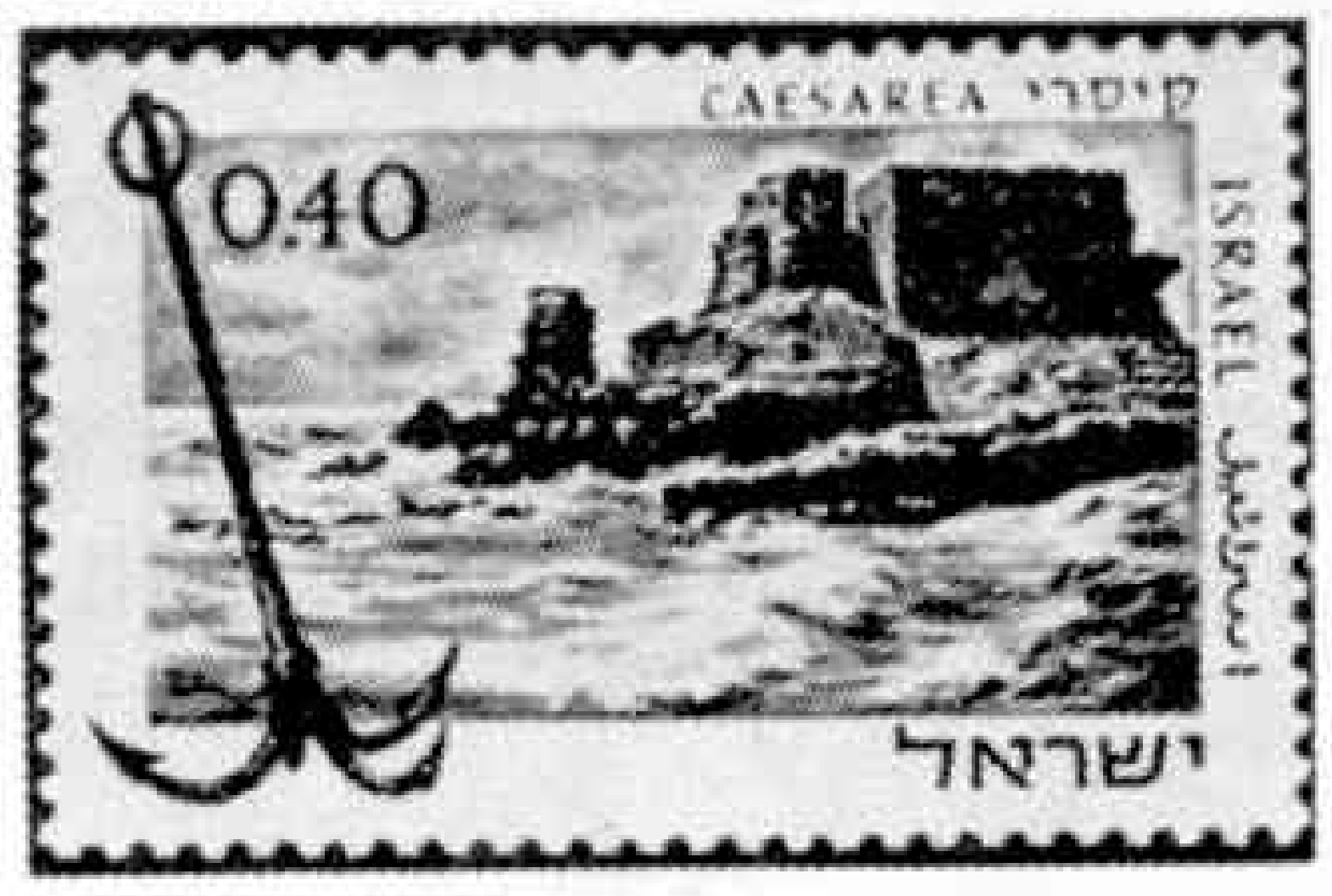
New Wayfinders Boots available in tan or black cost from just 49 11d. They've got a six month's guarantee. And they are fully approved for Scouts and Cubs. They're in the shops now, so get yours - today!

WAYFINDERS, 151 OXFORD ST., LONDON, W.1

Stamps News By F.E.Metcalfe







States

This is undoubtedly a changing world. Many collectors—for West Indian stamps have always been very popular in the Commonwealth and the U.S.A.—will recall collecting the stamps of those small islands, and they must have had a bit of a shock, when one of the tiniest of them issued a very flamboyant set of four stamps at the end of February, all of which featured a striking flag, and bore the title 'State of Antigua'. The fact is that this little island, along with its sister, Barbuda (smaller still), have shed their colonial relationship—not shedding, of course, their right to financial help—and now claim statehood. Other West Indian islands have taken a similar step, and whilst we are still responsible for their defence, they can, apart from that, go their own sweet way, and good luck to them. Let's hope that in time they can also pay their way. We won't mind, will we?

Ancient Ports

If I were asked to name the country which issued the most interesting stamps, I think I would have to think twice before I left Israel out of consideration. For instance, take the set of three stamps issued in March to depict ancient ports. Those illustrated on the stamps are Yafo, Akko and Caesarea. Now I must admit, in my ignorance, that I do not recall ever having heard of the first two, but the latter, Caesarea, yes, that name is familiar. This is quite a delightful issue, one that the many collectors of Israel stamps will want. Incidentally, I am often asked if stamps are a good investment. Well, without going too deeply into that knotty subject, it can be said that those who have collected Israel stamps from early on, and bought them at then current rates, have certainly done very nicely for themselves.

EFTA

I don't know if our pair of stamps, as far as the designs were concerned, pleased everybody, but none will deny that they were a superb job of printing. Good for Harrisons of High Wycombe, who print stamps for over a hundred, yes, over a hundred countries. Incidentally, the designs actually picked by the committee which is supposed to select those which shall be used, were rejected (two of those they wanted for the floral set were also, and with every justification, turned down) and the two actually used, was the selection of the Post Office itself. Of course, all the other countries in EFTA issued stamps to mark free trade between themselves, and it is interesting to compare the various designs. Unfortunately, there is not room to illustrate more than one, and I have picked Switzerland, a country which is issuing regularly, very popular stamps. How do you like the Swiss effort as compared with our own?

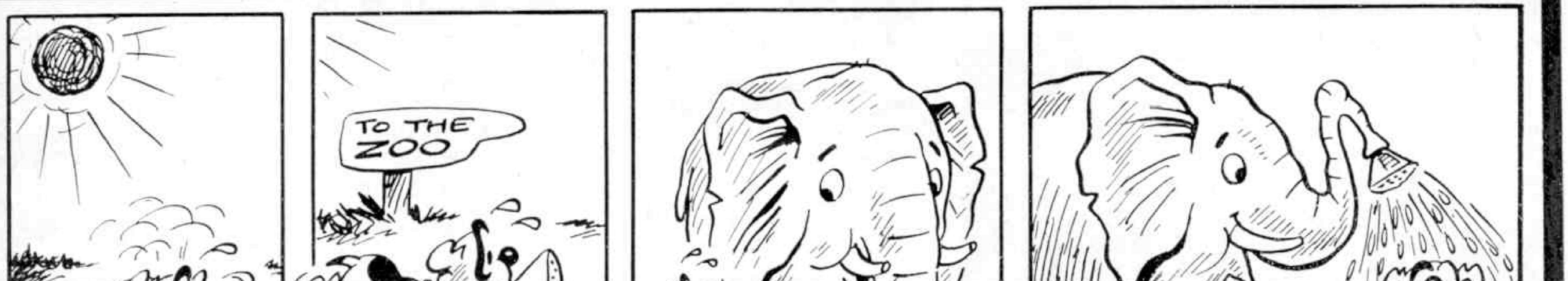
George Cross

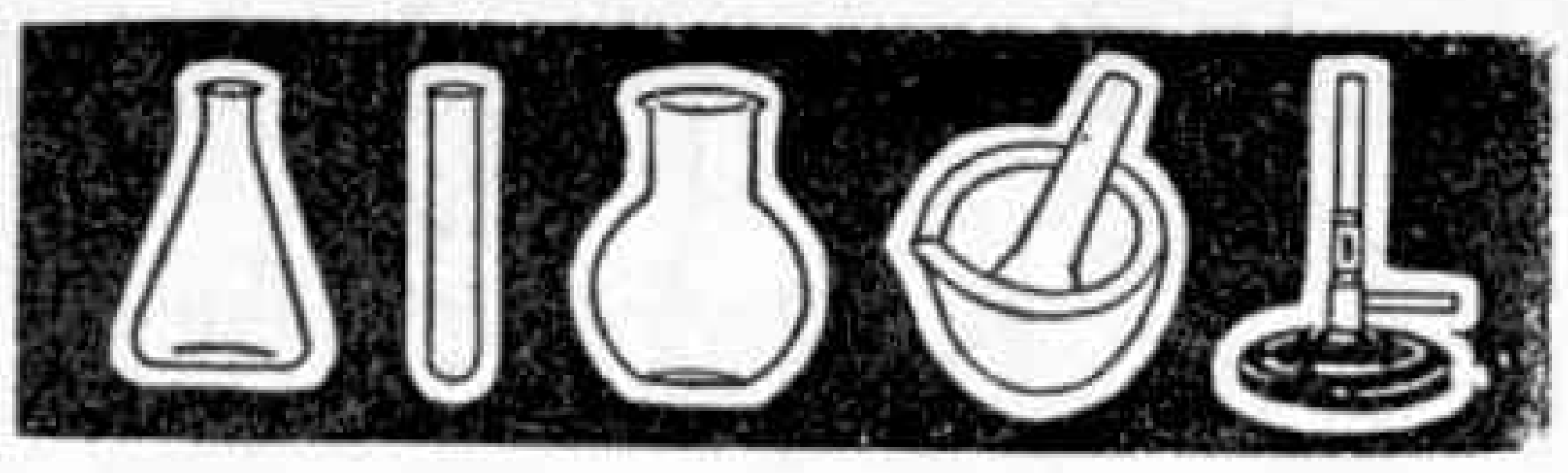
Malta has been in the news a lot lately, and as far as stamps are concerned, so attractive have been the designs of recent issues, that these are now more popular than ever. Take, for instance, the set released on March 1 to mark the twenty-fifth anniversary of the award of the George Cross. There have been a number of gimmick issues lately in the mad attempt to attract collectors' cash, which are gradually being seen through. Malta, on the other hand, is providing something new, which is in such good taste (*vide* the stamp illustrated of this latest G.C. issue) that its stamps are becoming more popular than ever. Of course, the fact that collectors in Europe now include them in their collections, is a telling factor. But a word of warning. Once before Malta overdid it, and for a long time its stamps were anything but wanted by many who previously had taken them. If the present rate is not stepped up, all well and good. But a substantial increase might easily kill that goose. Meanwhile, isn't the stamp illustrated attractively? It is one of a set of three, the colouring of which is a real delight.

Phosphor

Great Britain was, I think, the first to treat several values of its current stamps, with what are now known as phosphor lines, to aid electronic sorting, with Canada and the U.S.A. following suit. Now Holland is doing the same thing. All our stamps, under the face value of 2s. 6d., are now being treated thus. But don't forget that a new definitive set is being prepared (what a long-winded job they are making of it; the first three values will be released on June 4). Thus some of the current set, which have recently been treated, will have a very short life, so don't miss out. Phosphor stamps are generally worth more than the ordinary type, as can be seen from the different prices which prevail for the two kinds of special issues. For instance, the non-phos 'ITU' set sells for about 4s., whereas the phosphor makes well into the tens of shillings.

Chipper





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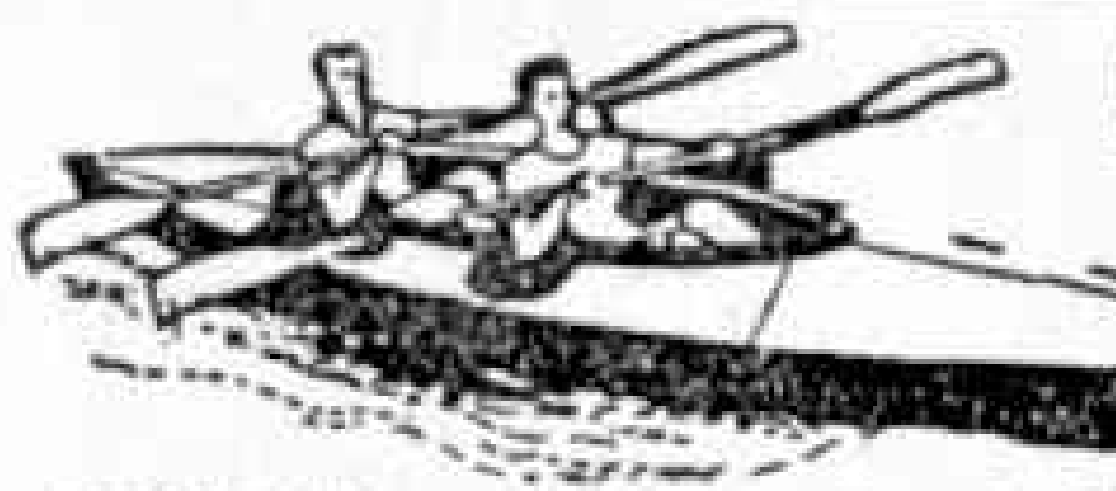

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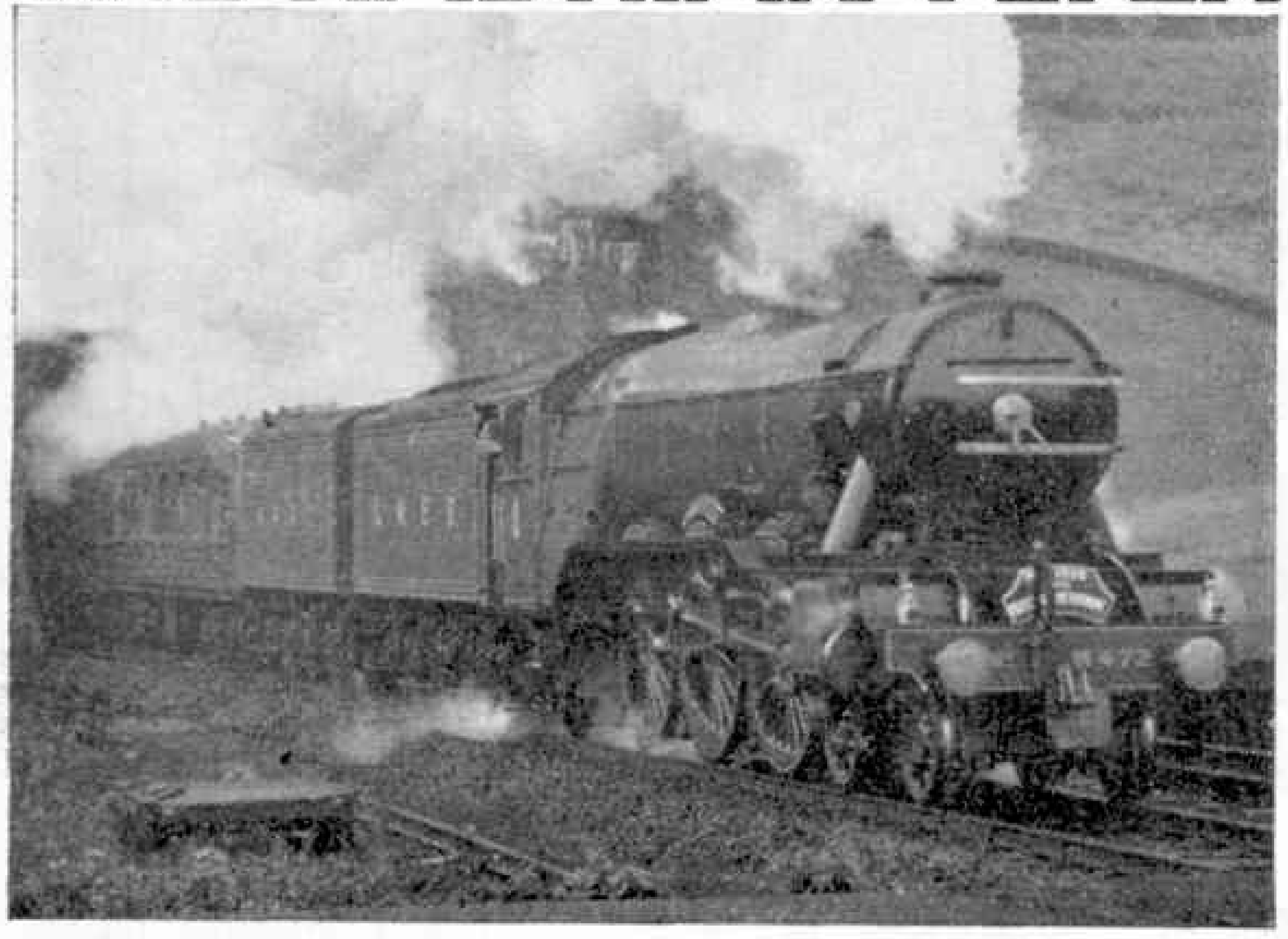

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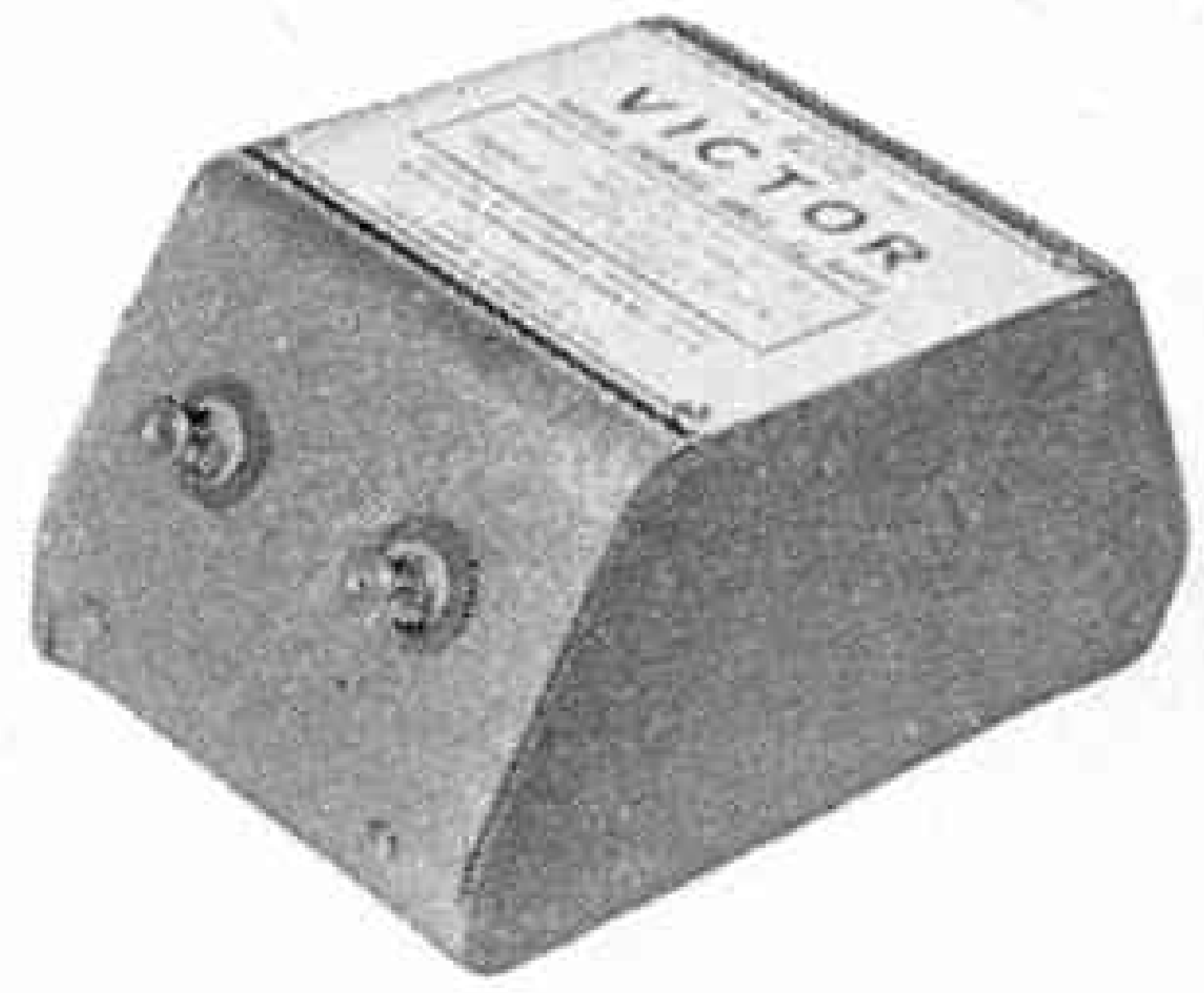

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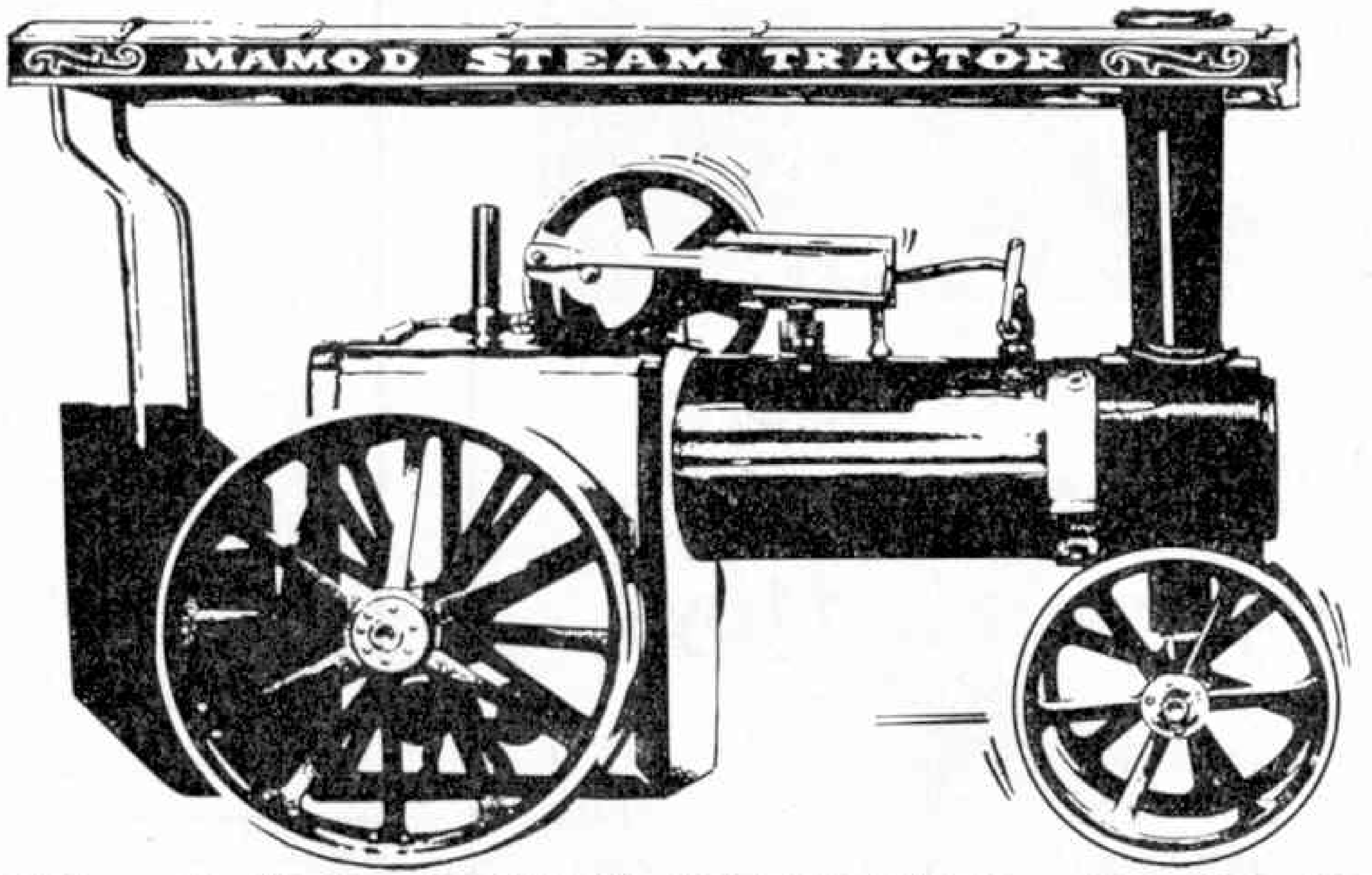

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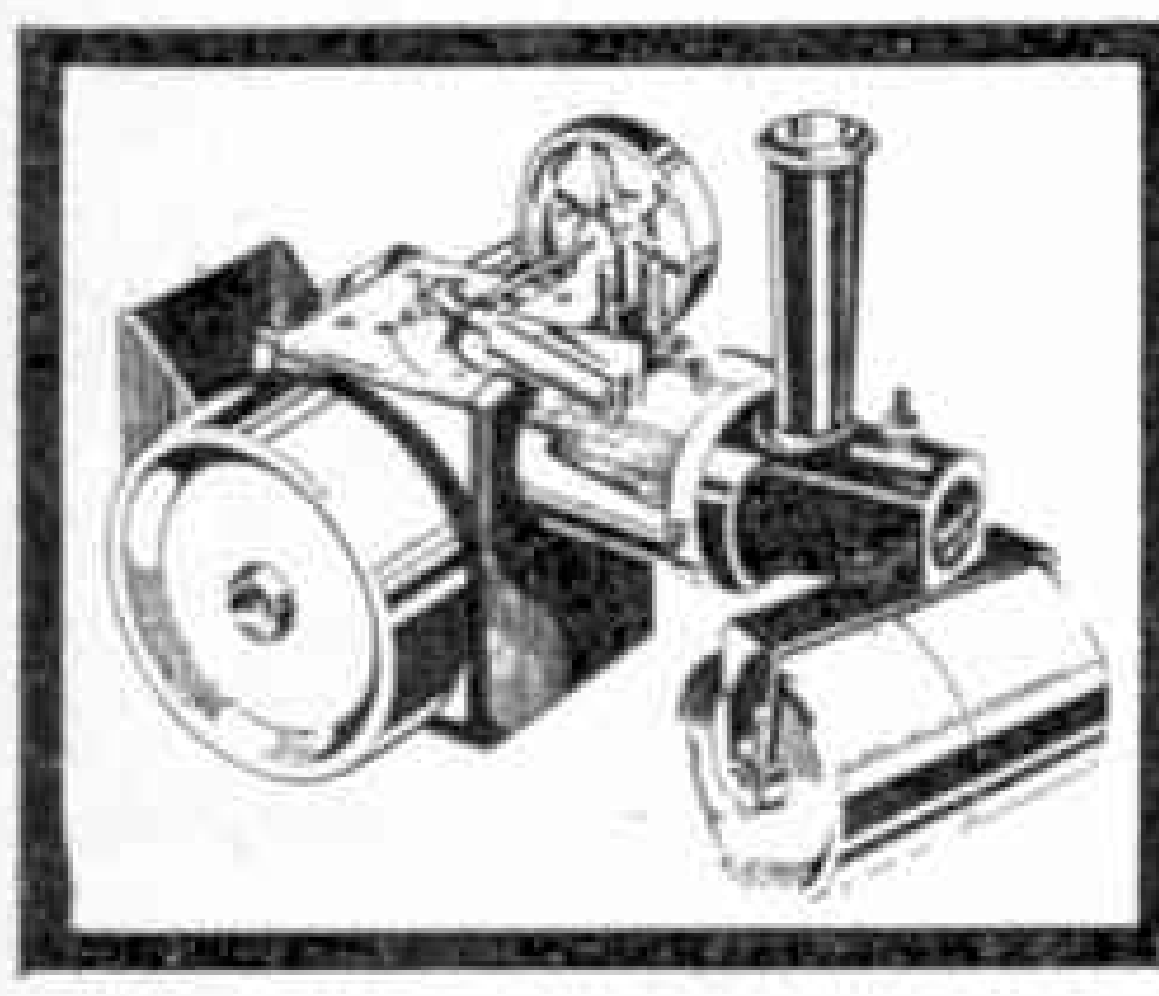

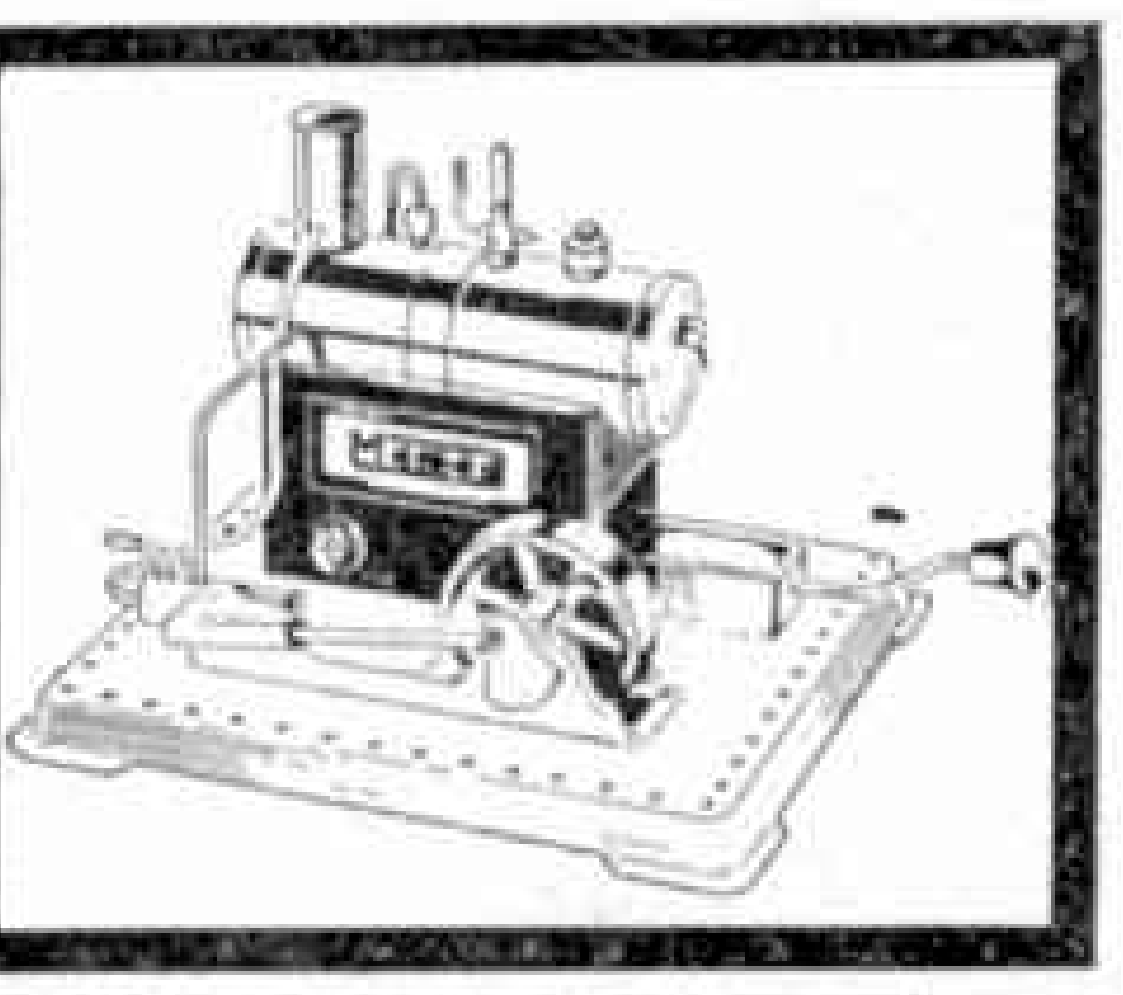

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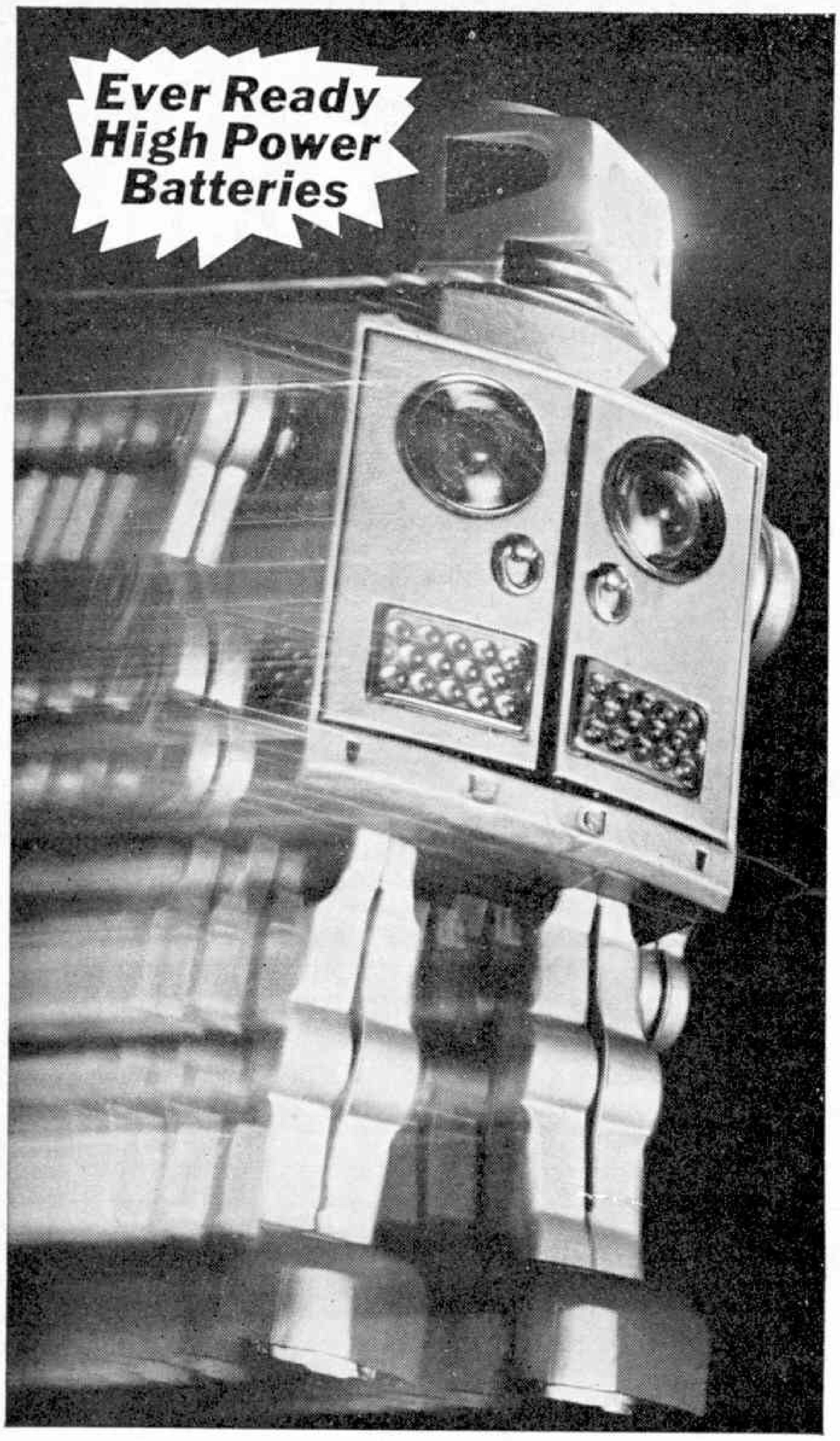

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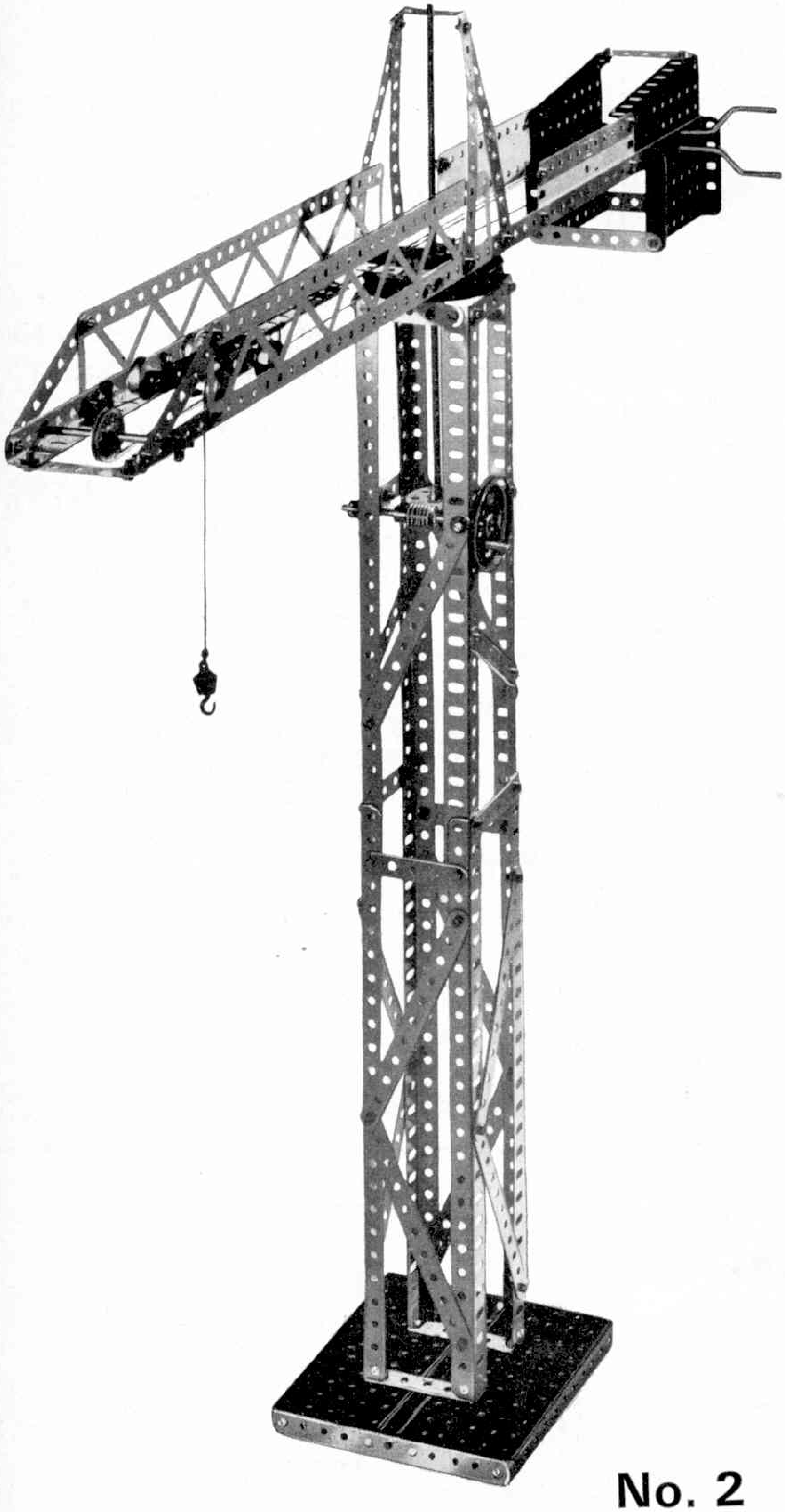

No. 2

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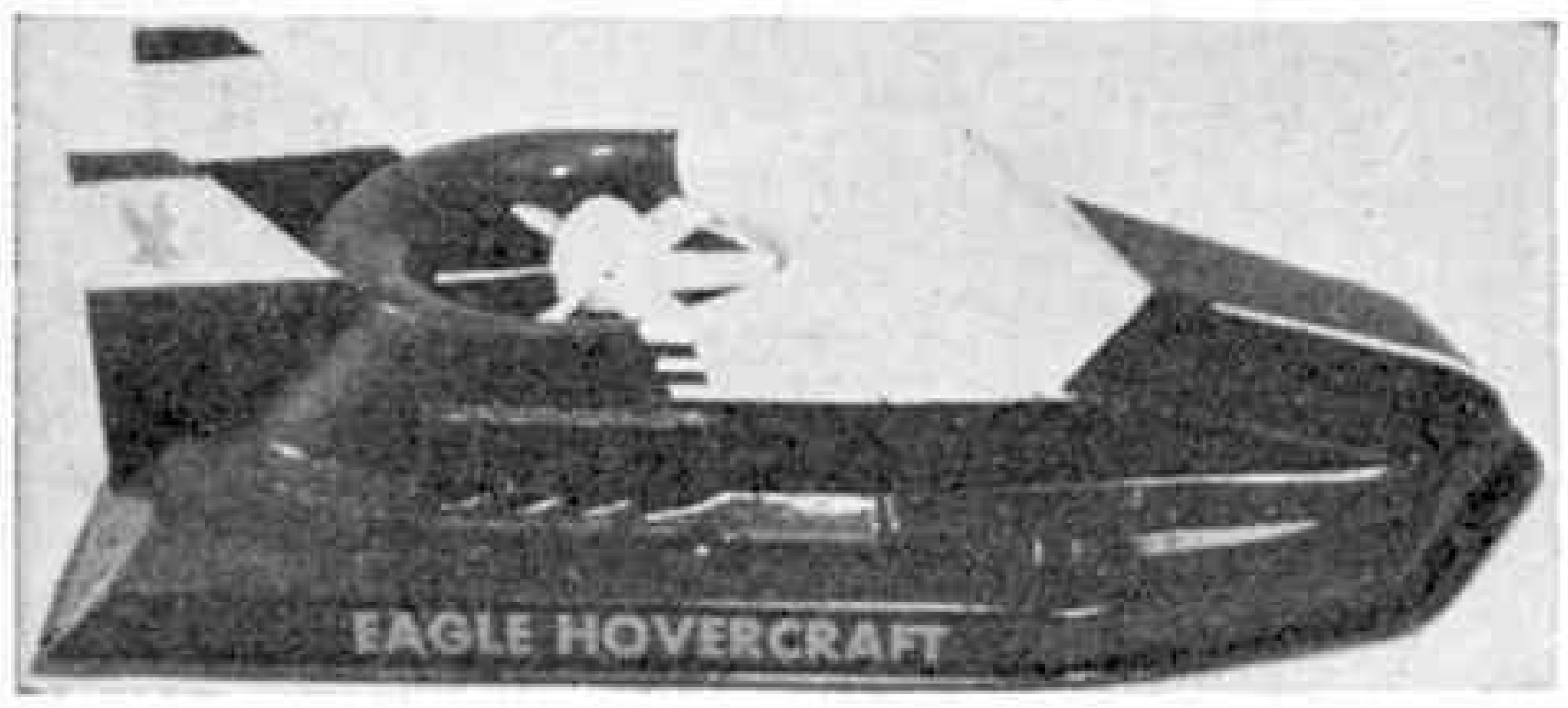

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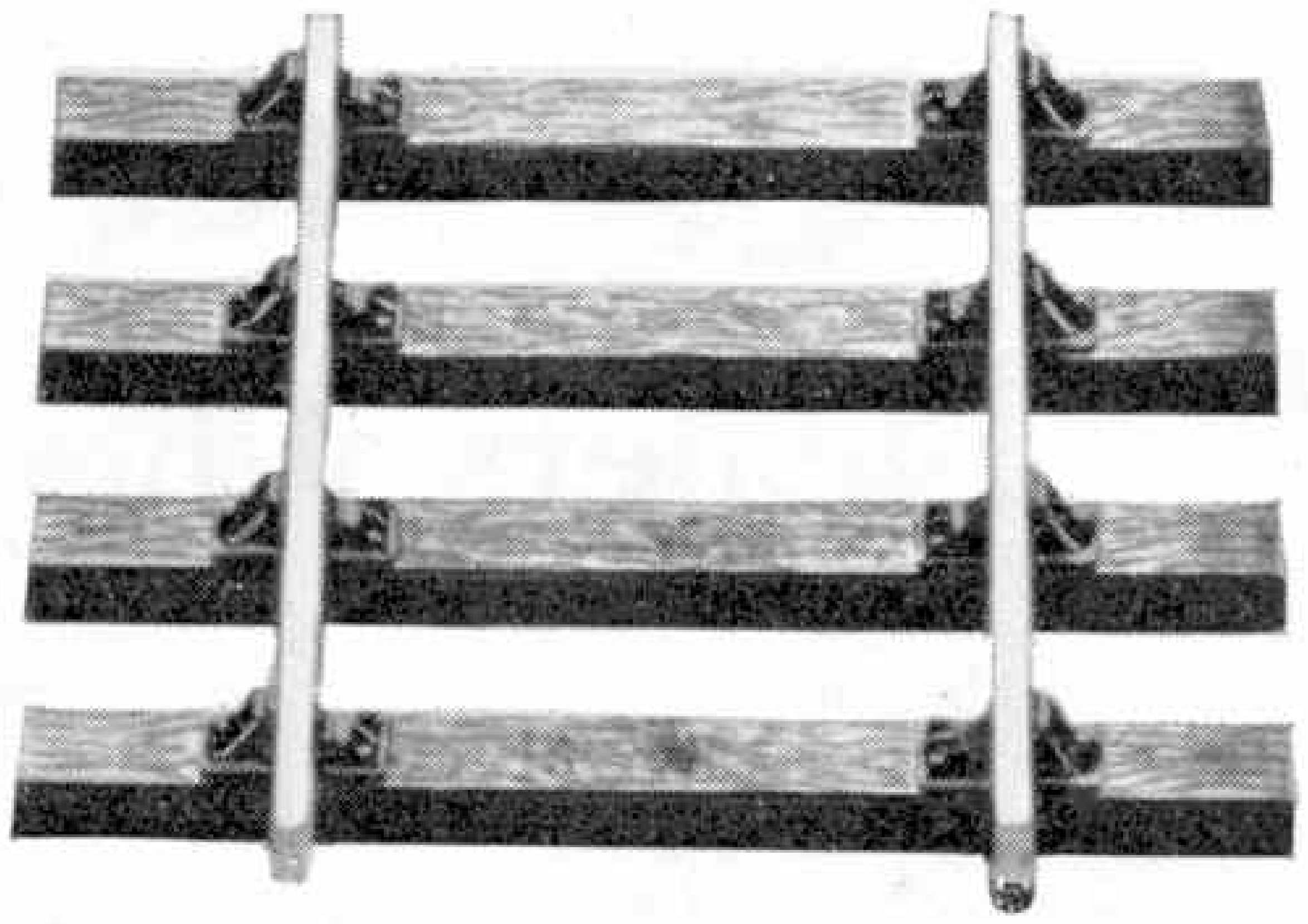

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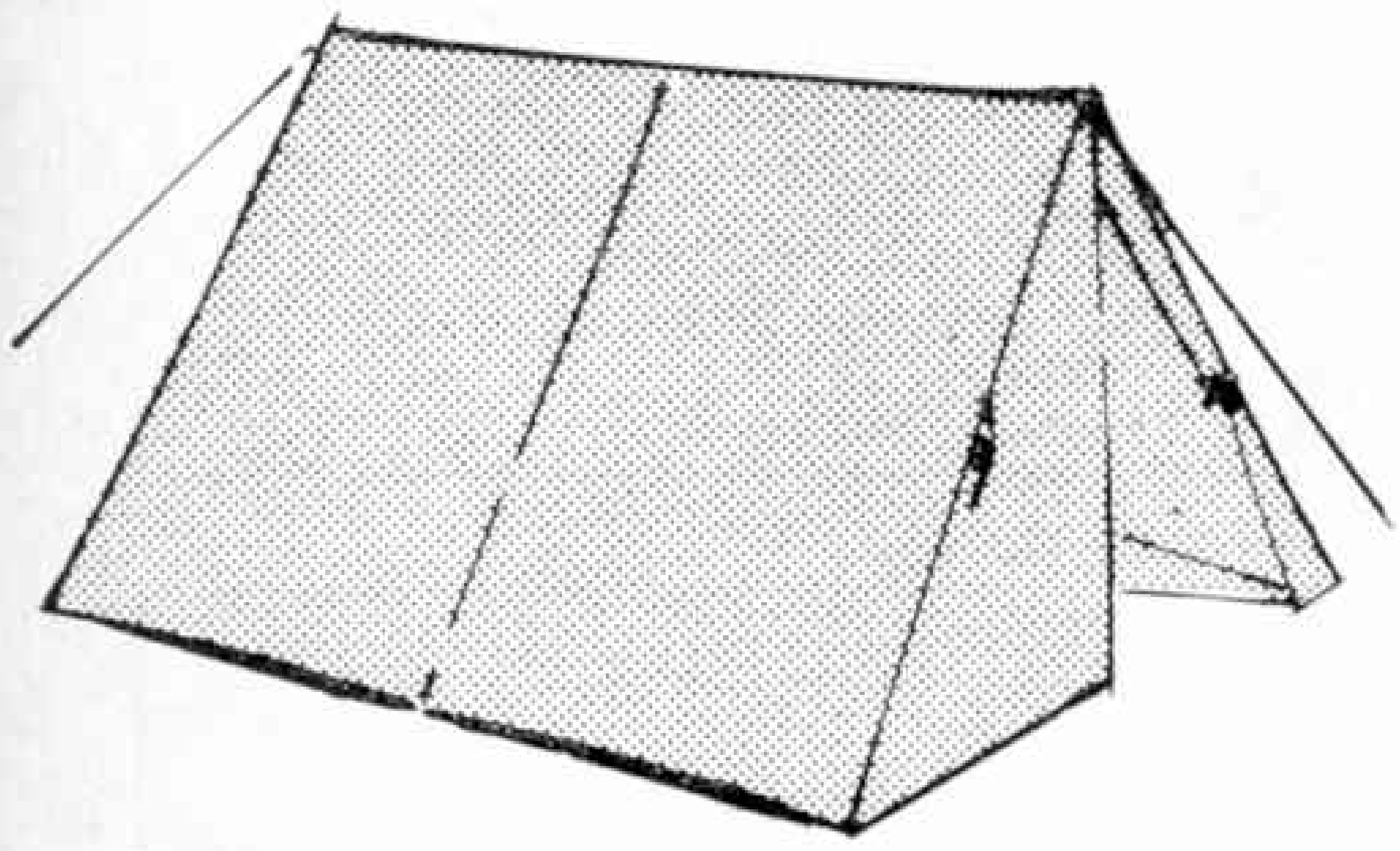

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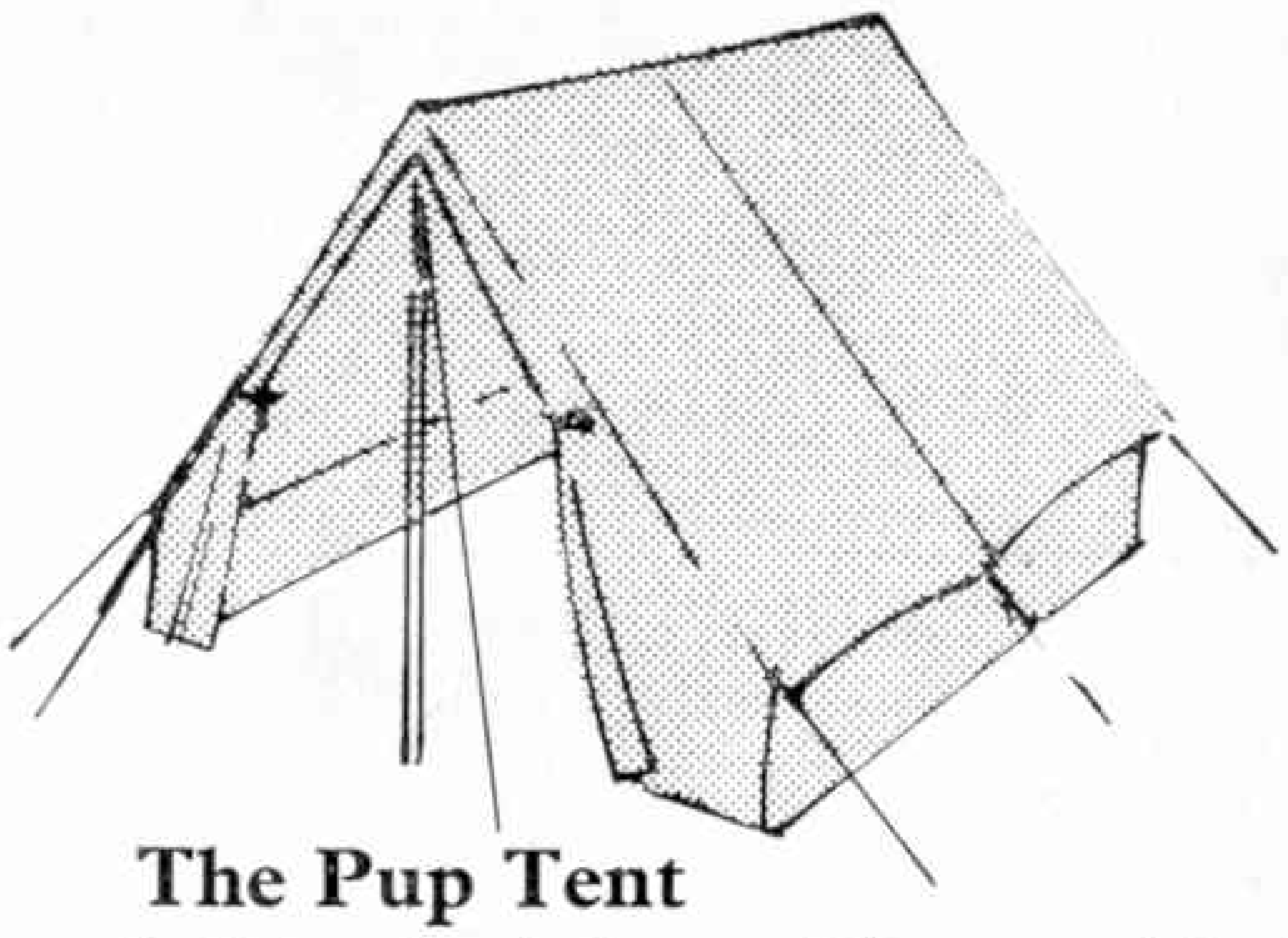

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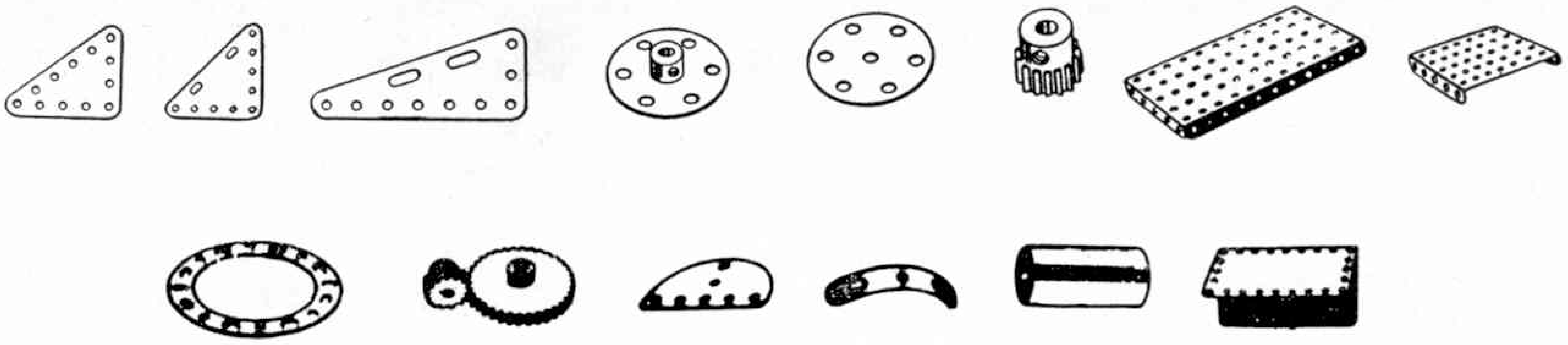

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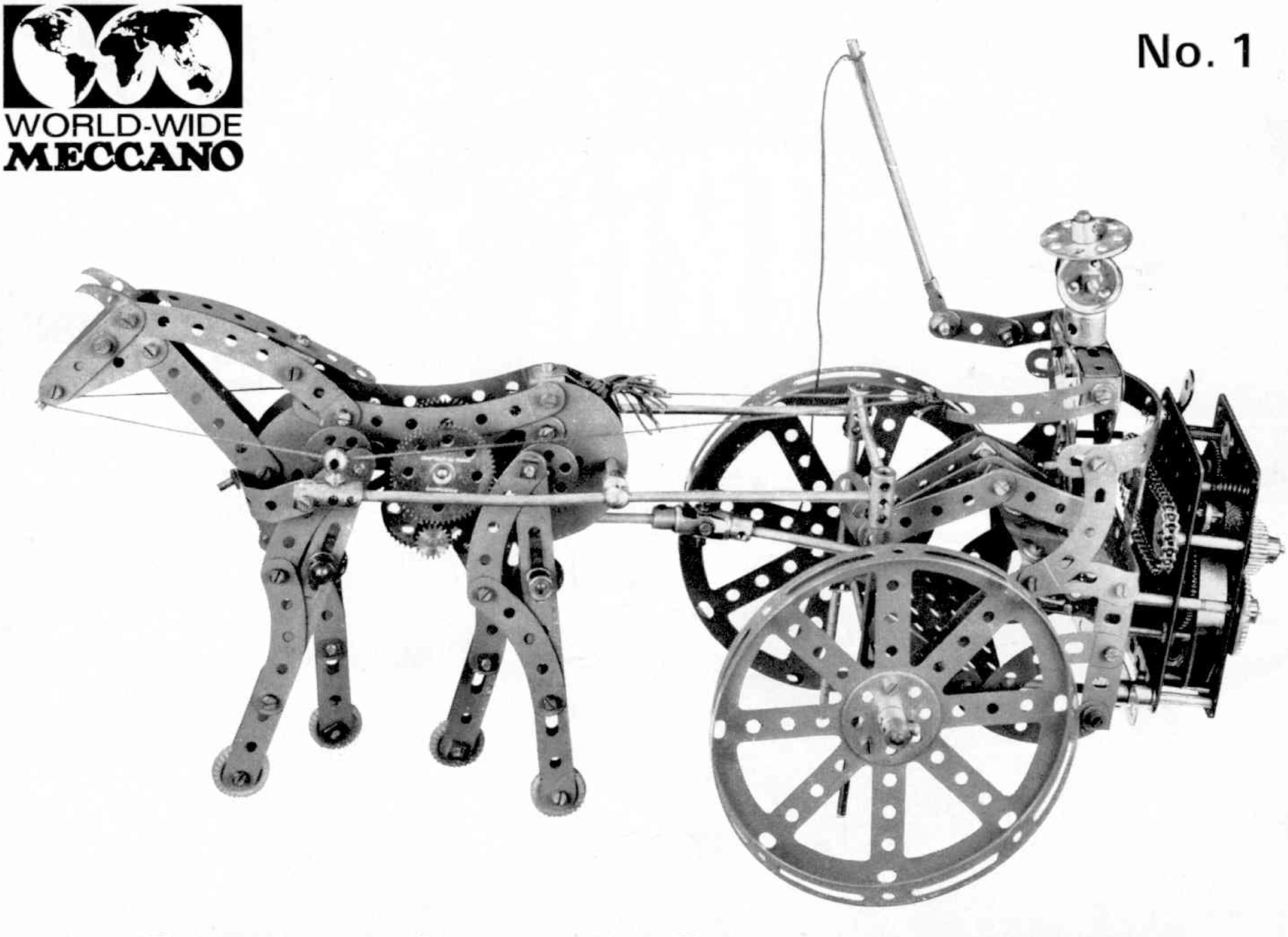
WORLD-WIDE
MECCANO

No. 1



A CHARIOT FROM HUNGARY

Meccano enthusiasts round the world make marvellous models. Original, ingenious, simply clever or cunningly detailed; practical, entertaining, educational . . . lots of descriptions apply to these masterpieces. But the best way for you to appreciate them is to see them.

The above illustration shows a splendid Horse and Chariot, devised and built by a keen Meccano man in Budapest. Powered by a Meccano clockwork motor, the horse actually walks and draws the chariot.

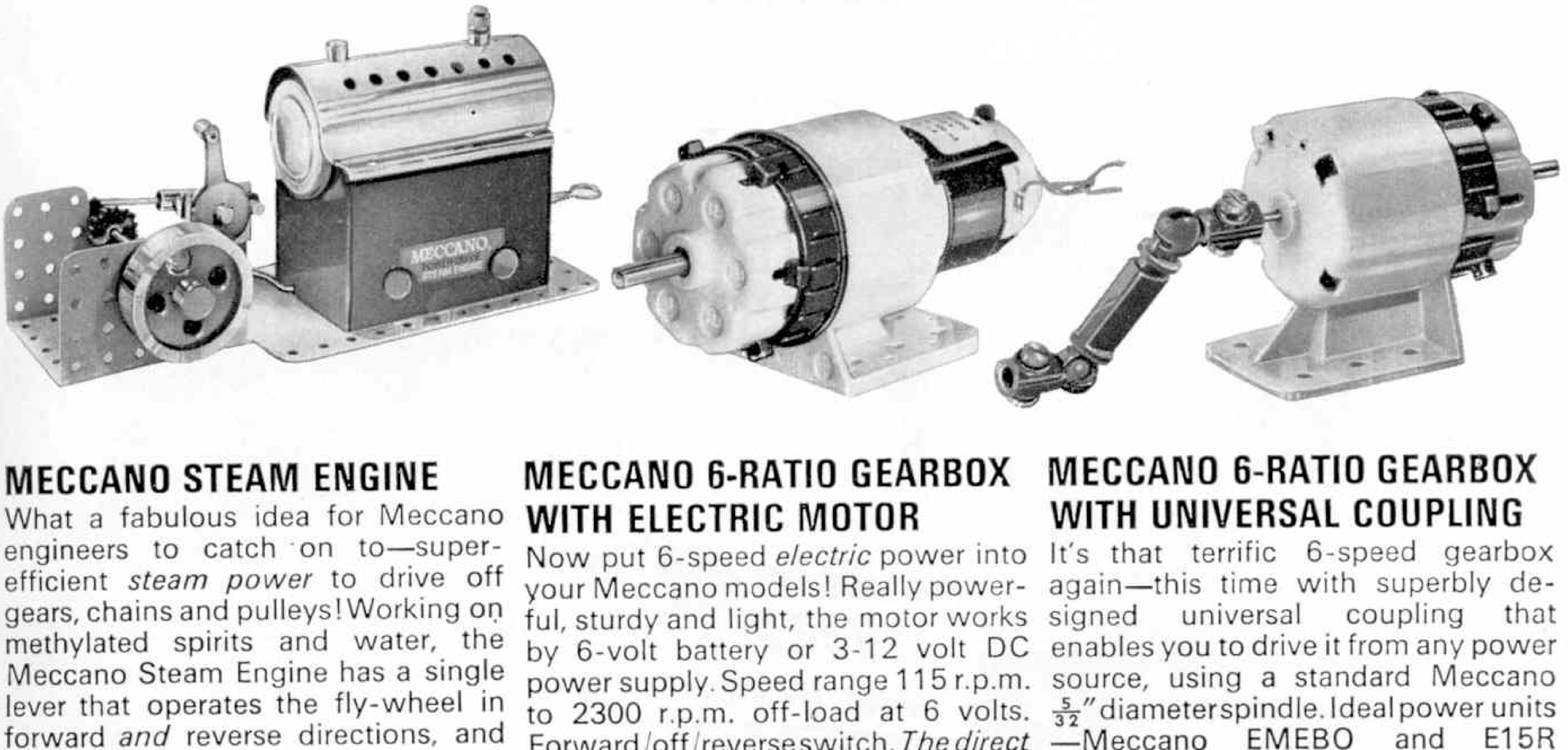
If you are already a Meccano enthusiast, you'll know what we're talking about, and how to extend your Meccano with the Conversion sets. But, if you have yet to discover the thrills of building with Meccano, there are ten fabulous sets that you should know about . . . from 15/3. (If dad's a stockbroker, we have one set at £56.10.0!). These are complete with instructions for making hundreds of models that really work.

We should like you to write about any models you've made which you think would be of interest to other Meccano enthusiasts round the world. Please send photographs and descriptions to Meccano Ltd., Binns Road, Liverpool 13.

THE WORLD'S GREATEST CONSTRUCTIONAL TOY

FORWARD OR BACKWARD, UP AND DOWN, LIFT, SPIN, PULL, PUSH

make your **MECCANO** models move with these New Power Units



MECCANO STEAM ENGINE

What a fabulous idea for Meccano engineers to catch on to—super-efficient *steam power* to drive off gears, chains and pulleys! Working on methylated spirits and water, the Meccano Steam Engine has a single lever that operates the fly-wheel in forward *and* reverse directions, and also controls the running speed. Clean, safe, simple to operate.

ONLY **70/3**

MECCANO 6-RATIO GEARBOX WITH ELECTRIC MOTOR

Now put 6-speed *electric* power into your Meccano models! Really powerful, sturdy and light, the motor works by 6-volt battery or 3-12 volt DC power supply. Speed range 115 r.p.m. to 2300 r.p.m. off-load at 6 volts. Forward/off/reverse switch. *The direct drive* gearbox transmission ratios are 3:1, 6:1, 12:1, 16:1, 32:1, 60:1. Gears may be changed while motor is running. Foolproof. Simple to operate. No maintenance required.

ONLY **50/9**

MECCANO 6-RATIO GEARBOX WITH UNIVERSAL COUPLING

It's that terrific 6-speed gearbox again—this time with superbly designed universal coupling that enables you to drive it from any power source, using a standard Meccano $\frac{5}{32}$" diameter spindle. Ideal power units —Meccano EMEBO and E15R Electric Motors.

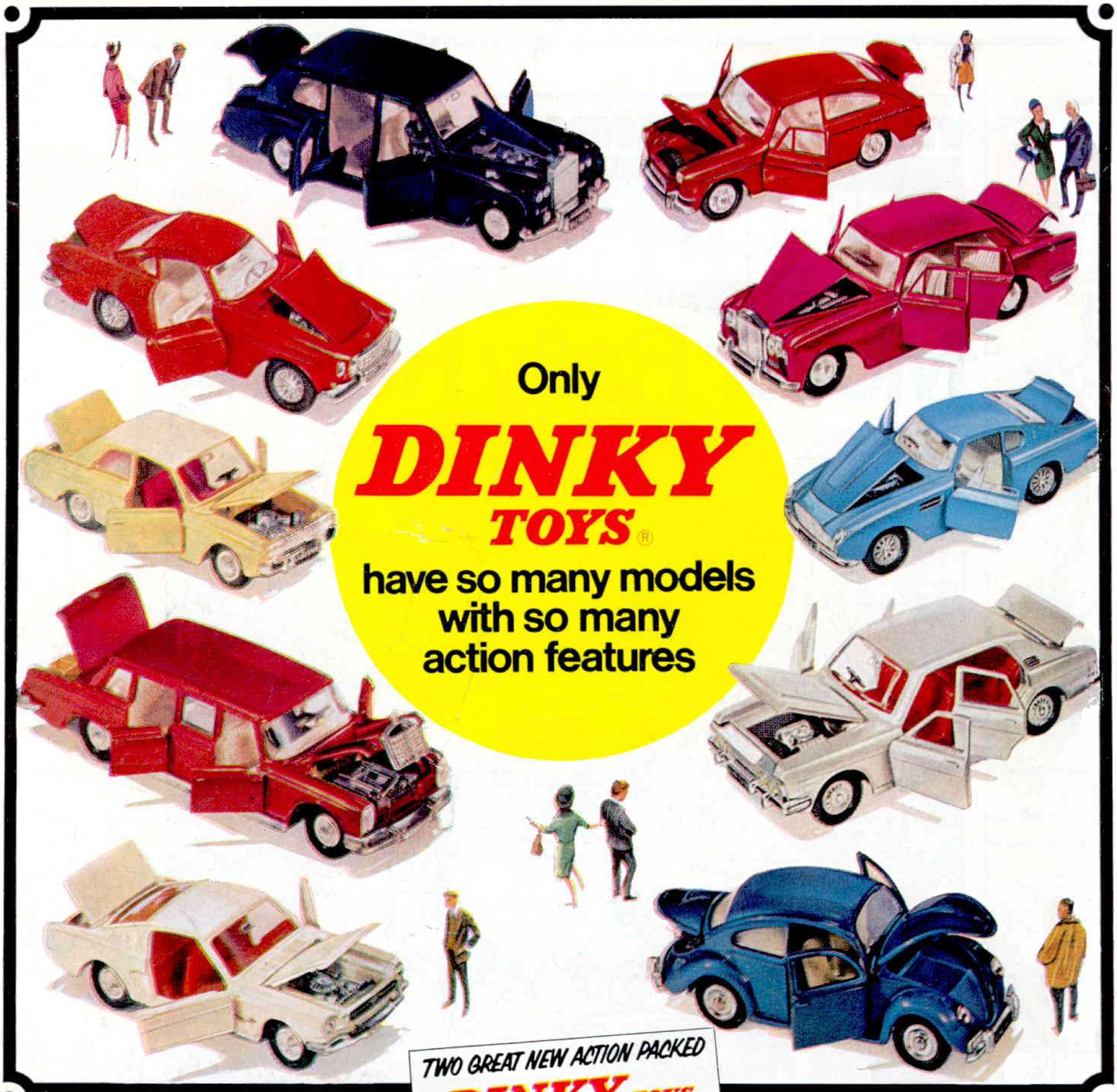
ONLY **30/9**

at your toy shop now—in smart 'see-through' packs!

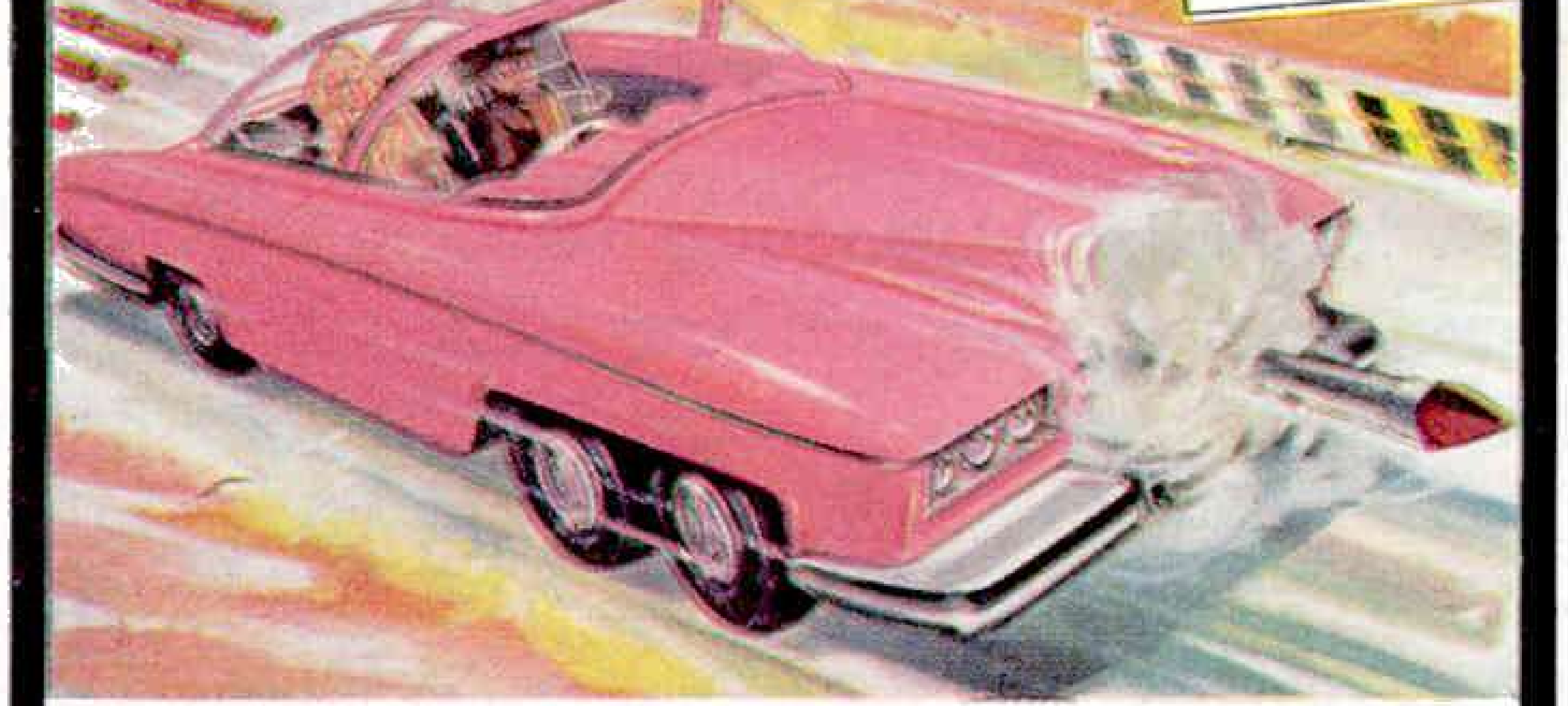
MECCANO® POWER DRIVE SERIES

COMPLETE WITH FULL INSTRUCTIONS FOR USE

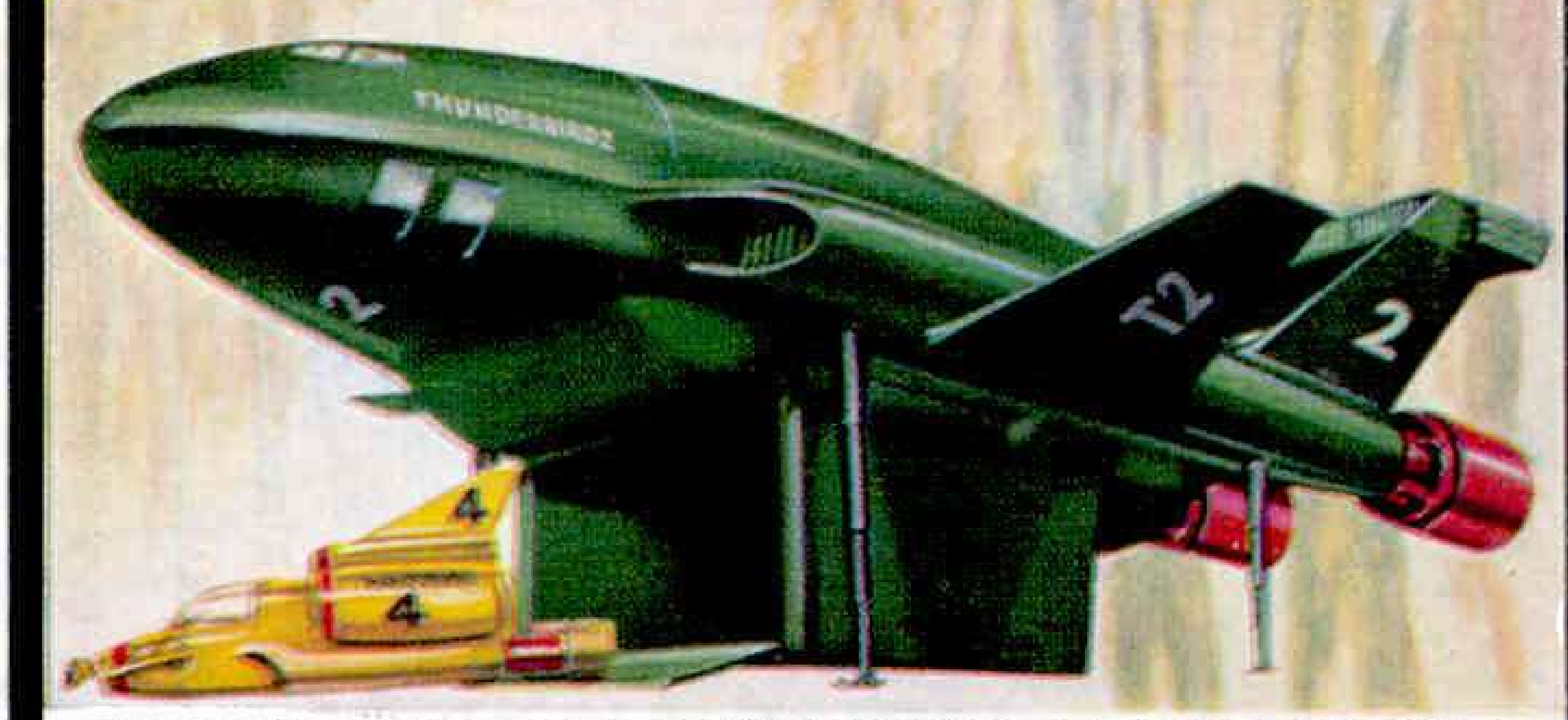
Meccano Ltd., Binns Rd., Liverpool



TWO GREAT NEW ACTION PACKED
DINKY TOYS®
FROM THUNDERBIRDS



LADY PENELOPE'S ROCKET-FIRING FAB 1 •Fires 5 rockets (Hinged radiator conceals big block-buster, and there are 4 pursuit rockets) •Sliding cockpit canopy •Lady Penelope and Parker •Jewelled multiple headlights •Super Finish •Plated details. Length 5¼"



THUNDERBIRD 2 WITH THUNDERBIRD 4 •Sensational 2 in 1 special from DINKY •Thunderbird 2 has spring released telescopic legs •Pod contains Thunderbird 4 for solo flights to high adventure. •Superb details. Overall Length 5½"

From Hamleys, Harrods, Gamages, Selfridges, and all good toy shops. Manufactured by Meccano Ltd., Binns Rd., Liverpool.

There's always something new from Dinky.

Published by Thomas Skinner & Co. (Publishers) Ltd., St. Alphage House, Fore St., London, E.C.2. Printed by James Cond, Charlotte St., Birmingham 3

'FLIPPER'

Meccano Magazine June 1967

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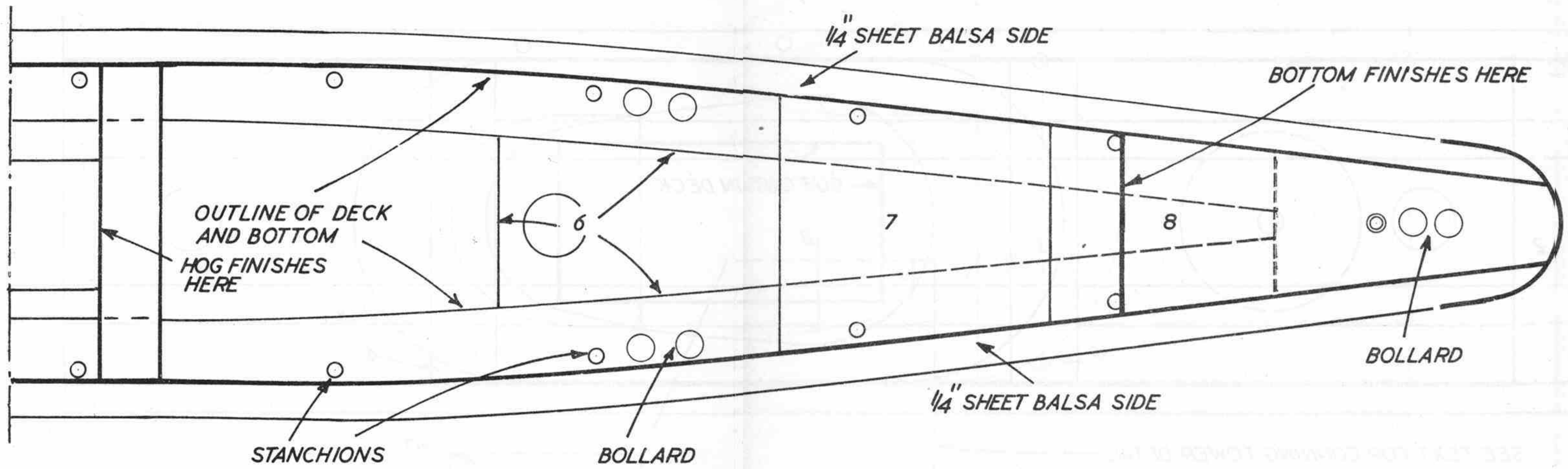
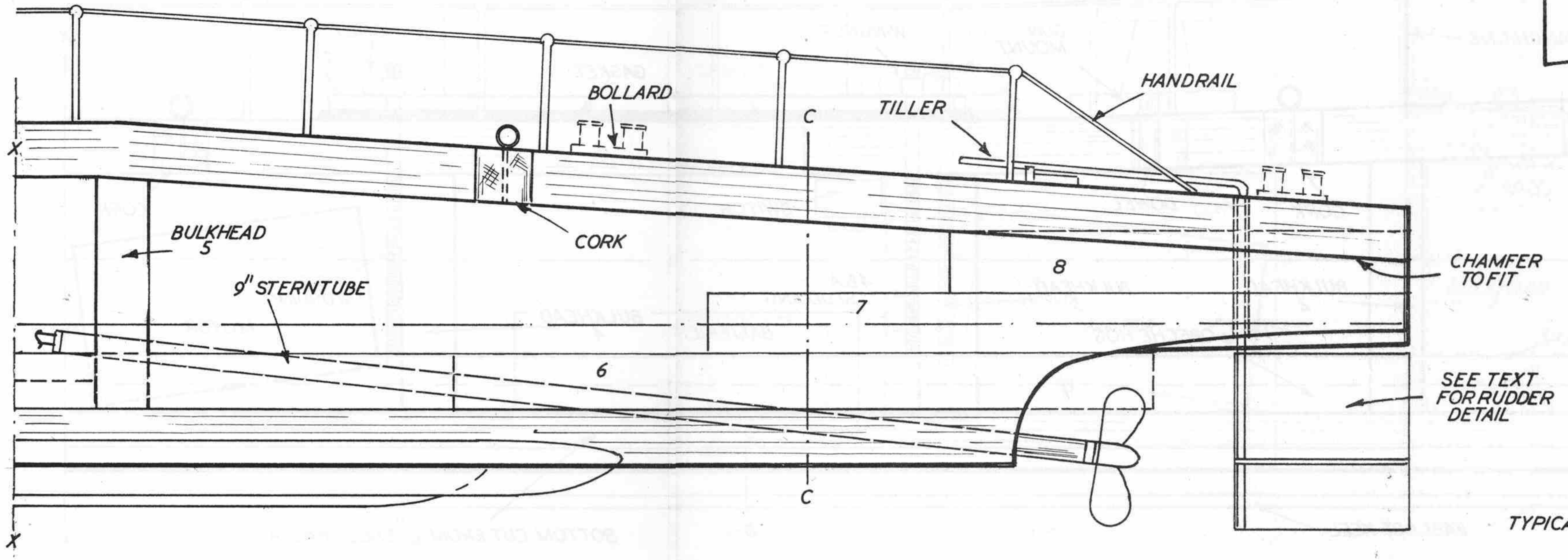
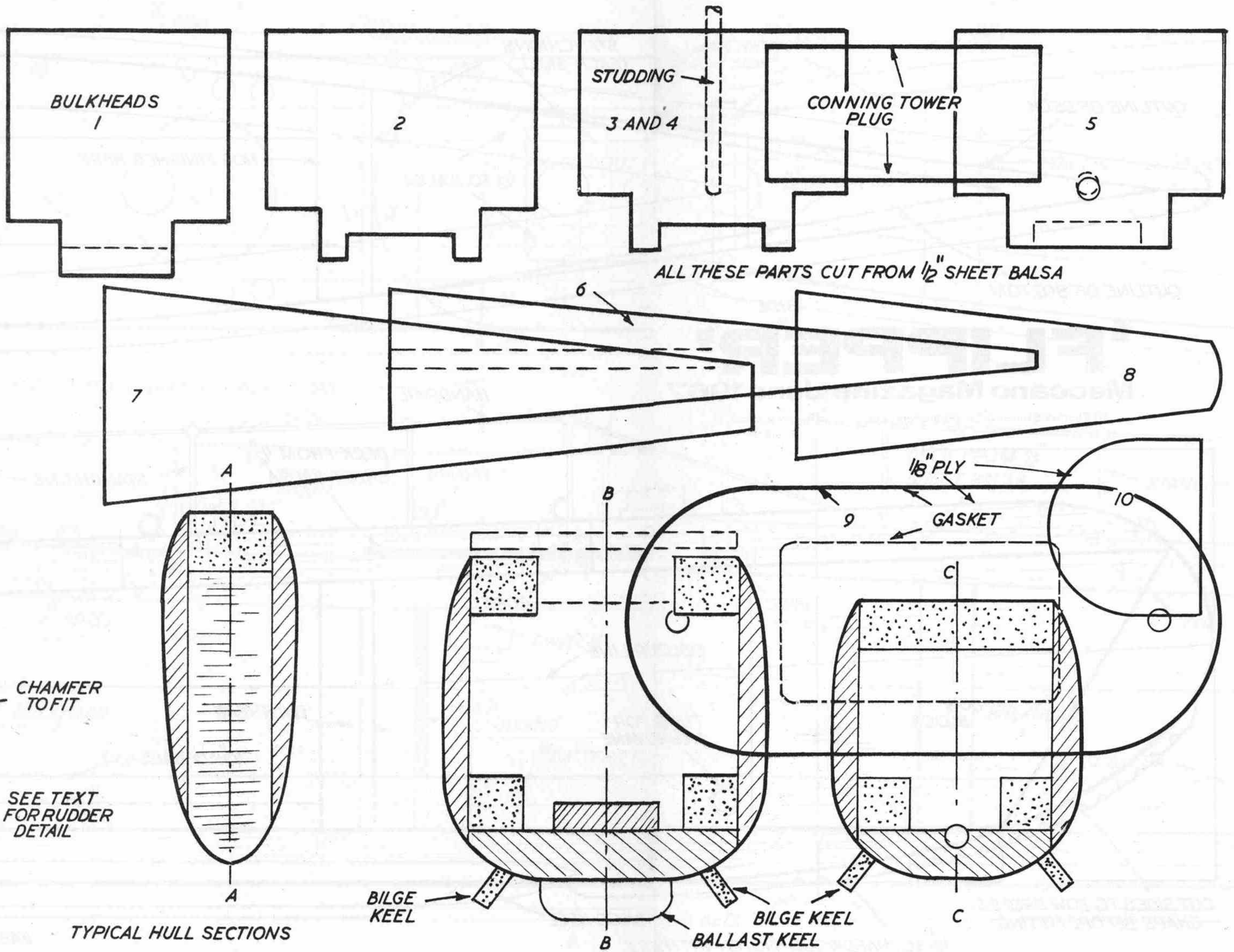
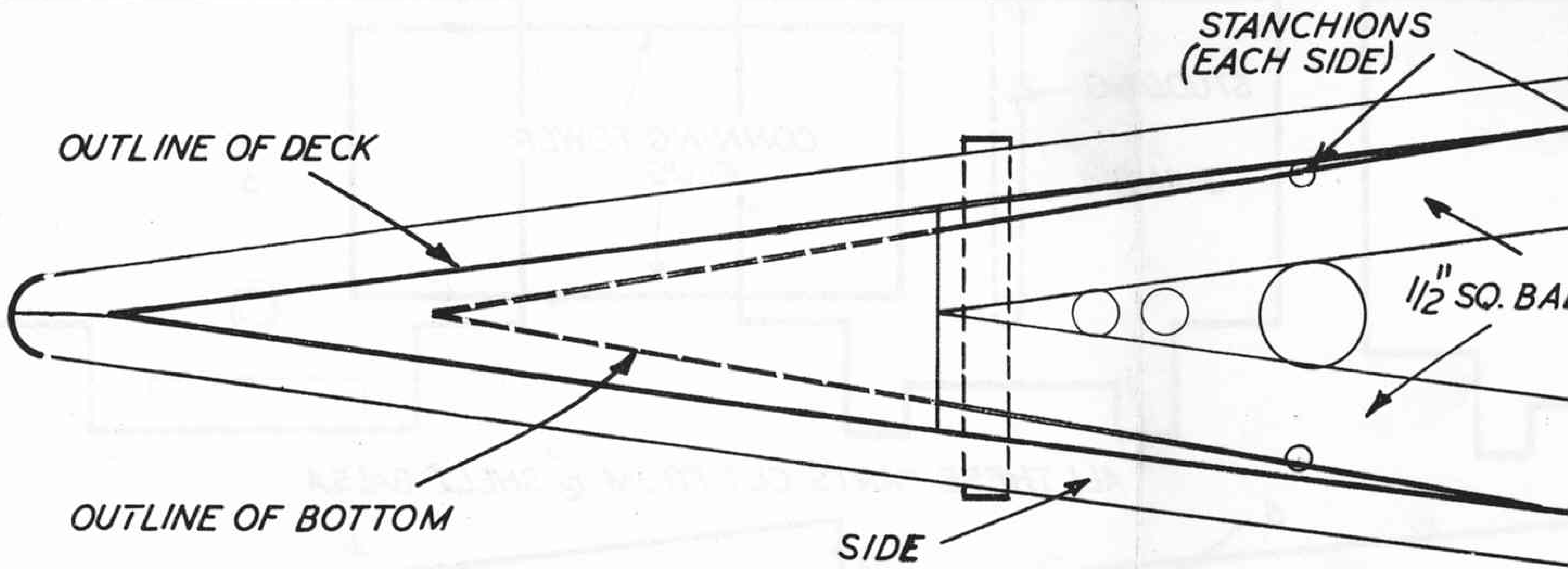






ALL THESE PARTS CUT FROM 1/2" SHEET BALSA

TYPICAL HULL SECTIONS



'FLIPPER'

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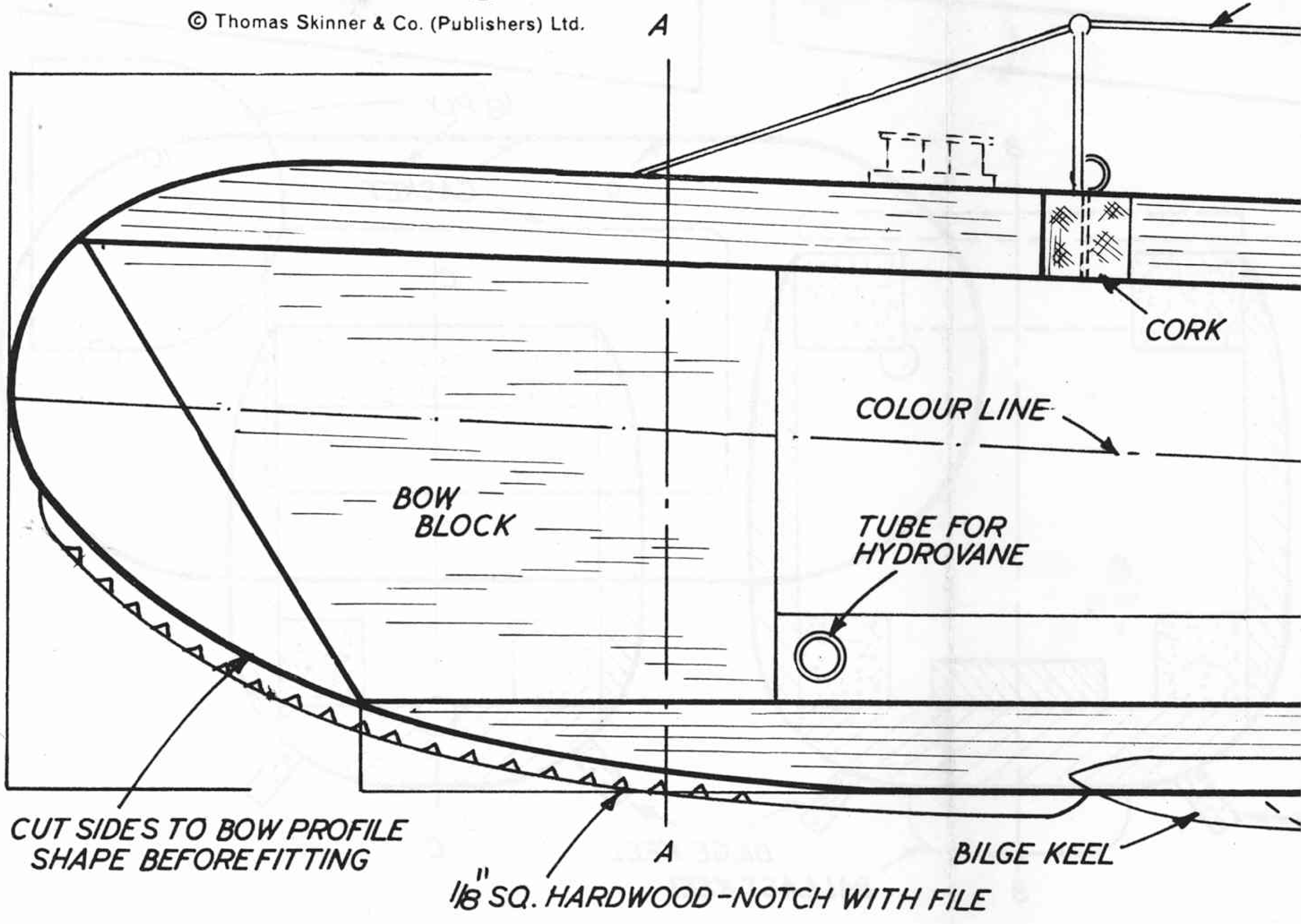
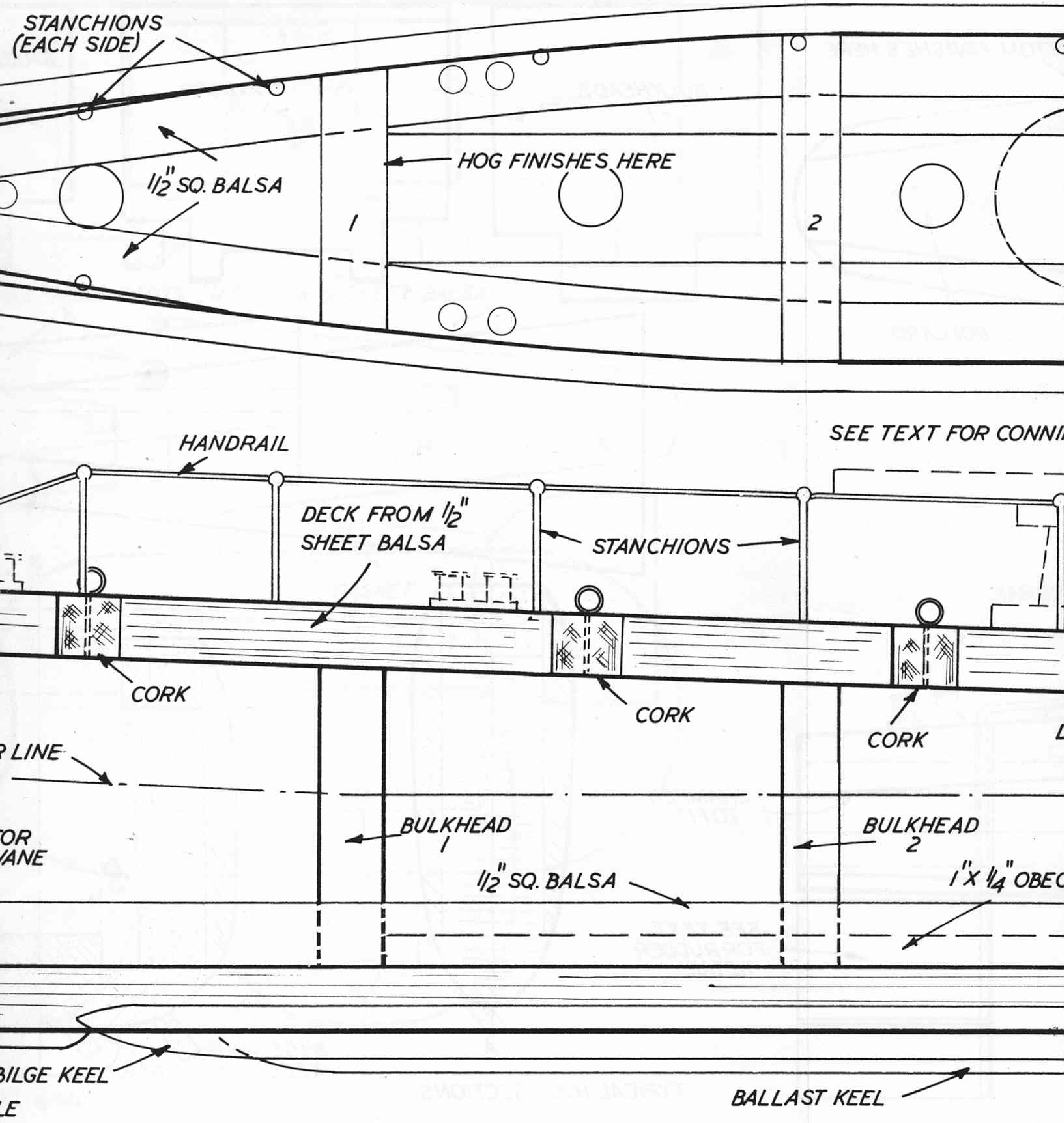
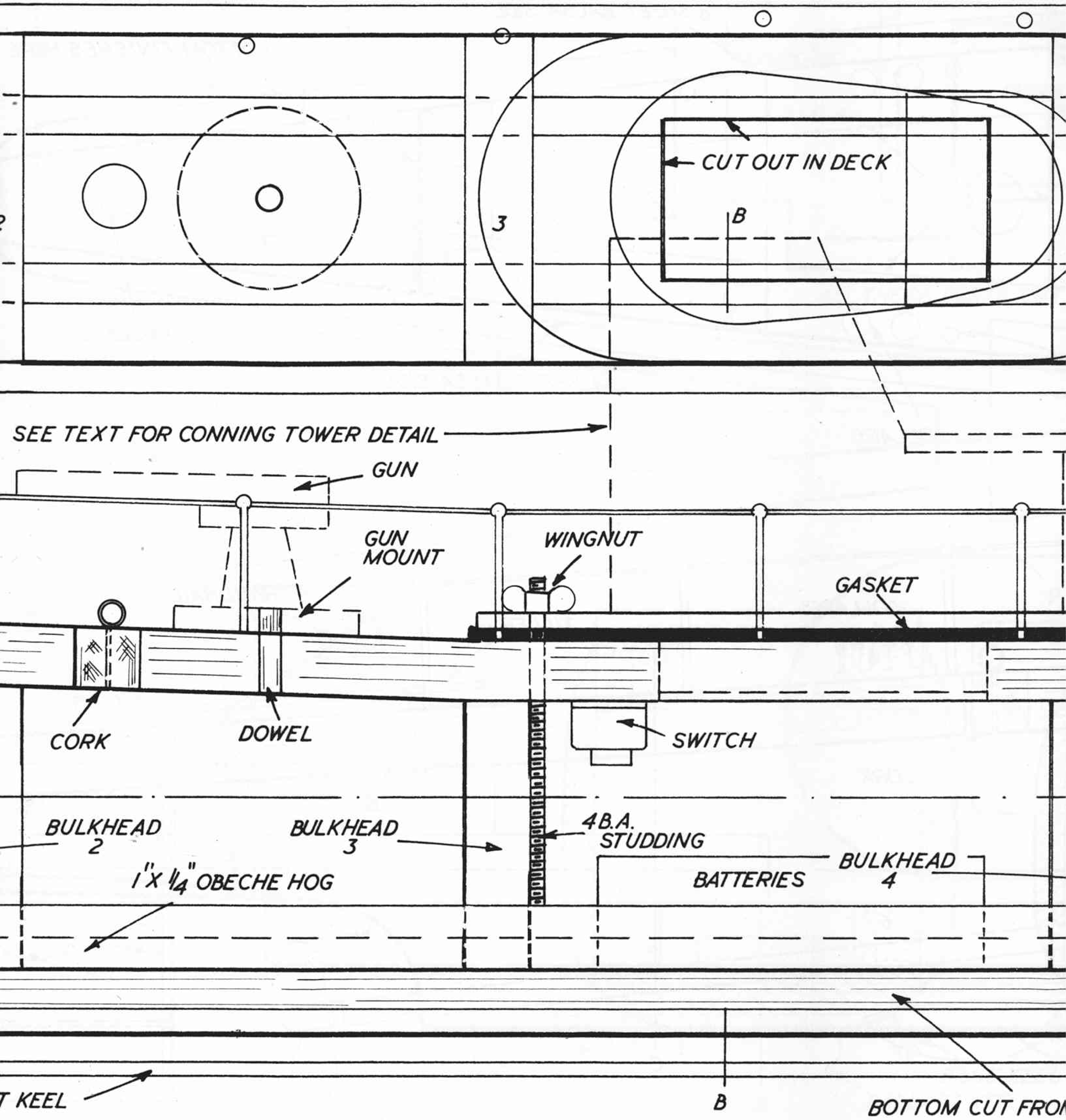
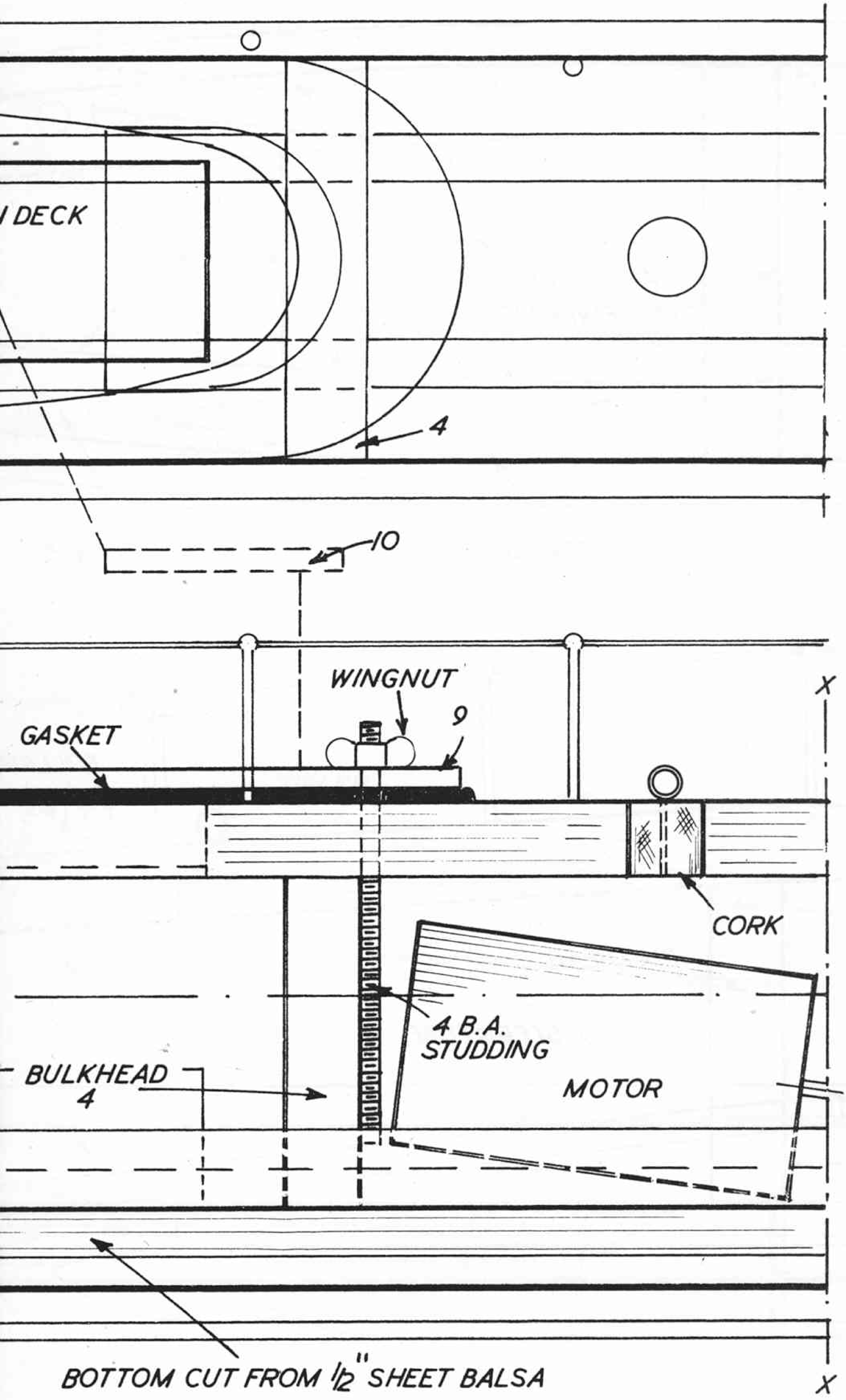
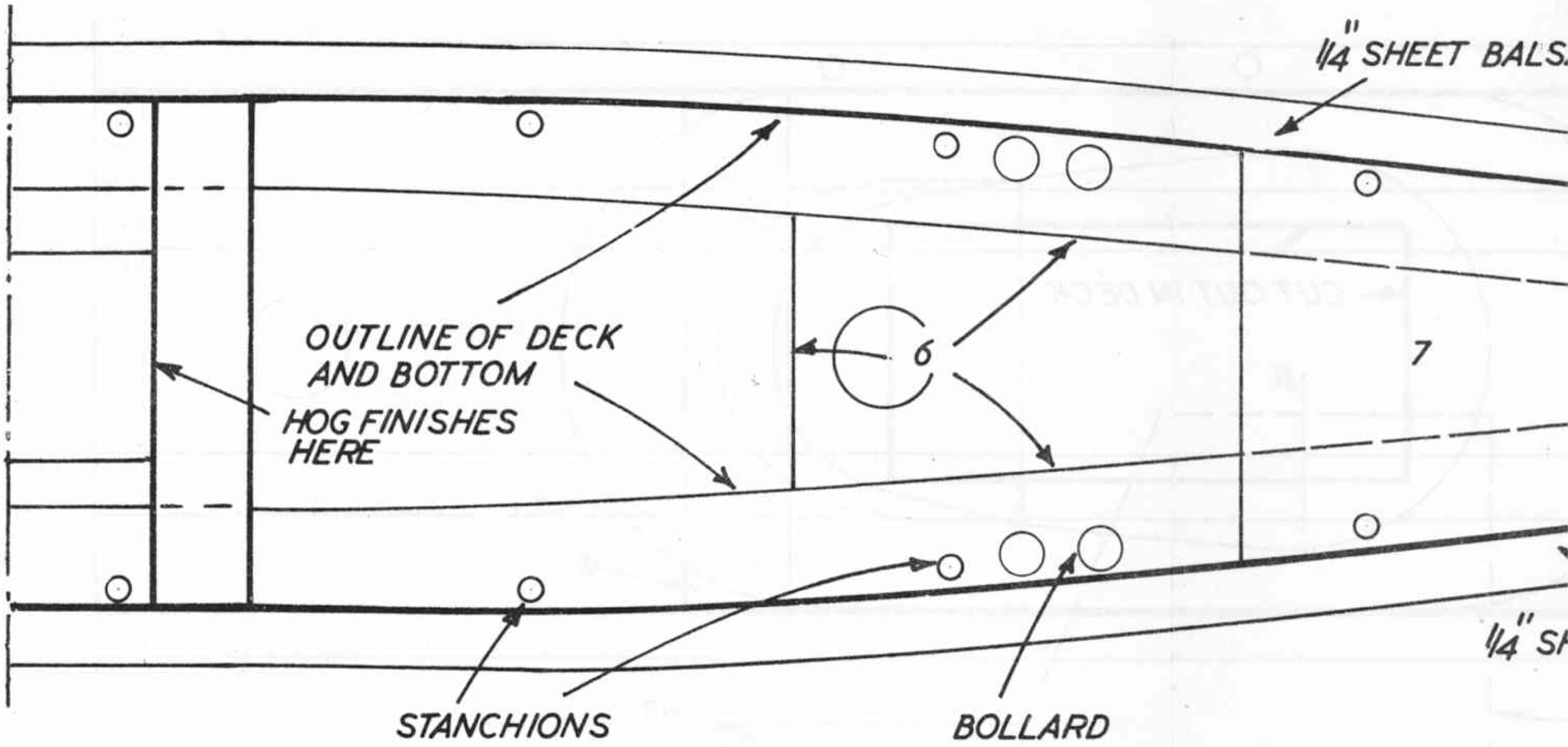

A
HANDI
CORK
COLOUR LINE
BOW BLOCK
TUBE FOR HYDROVANE
CUT SIDES TO BOW PROFILE SHAPE BEFORE FITTING
A
BILGE KEEL
1/8" SQ. HARDWOOD-NOTCH WITH FILE

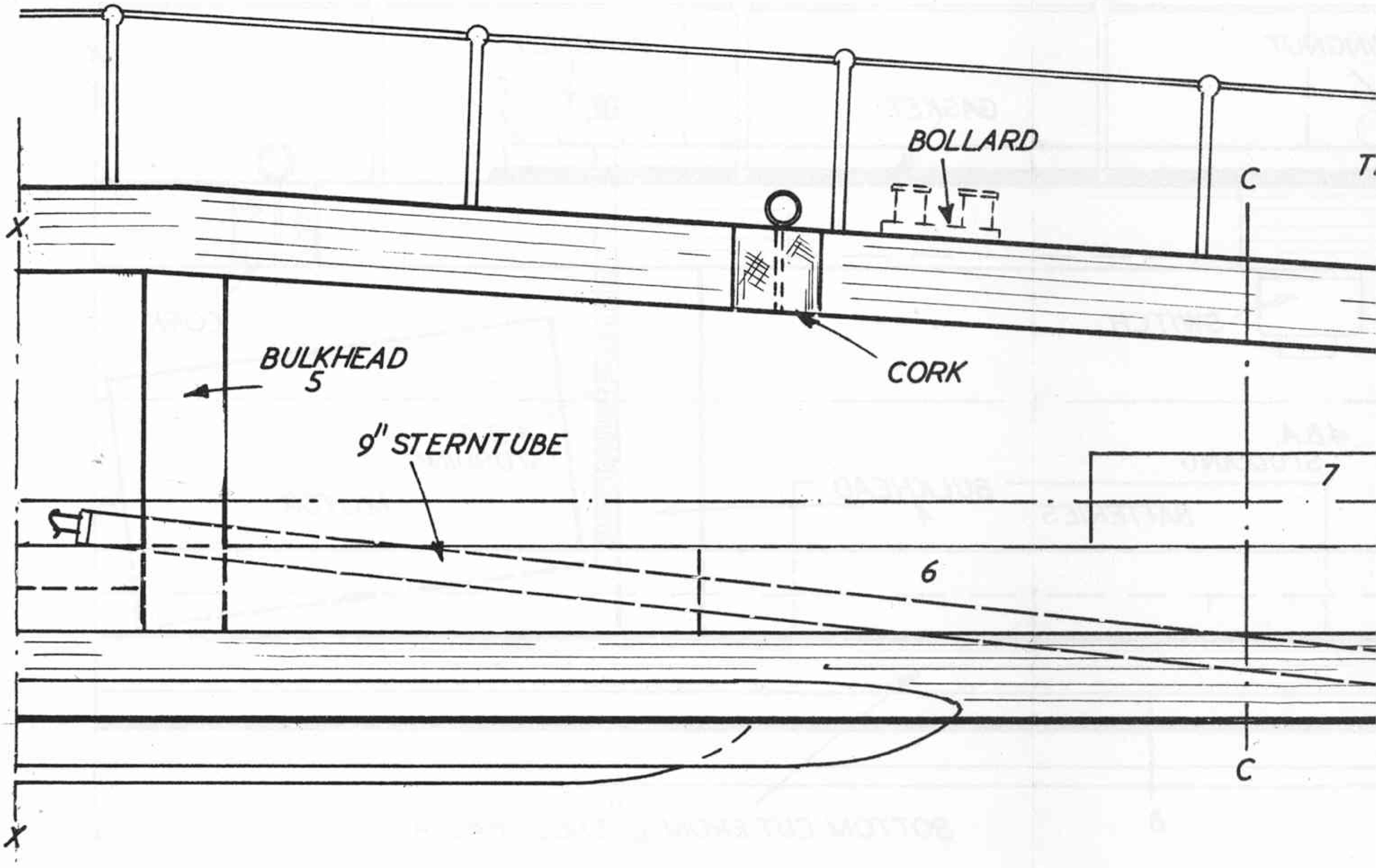

STANCHIONS (EACH SIDE)
1/2" SQ. BALSA
HOG FINISHES HERE
1
2
SEE TEXT FOR CONNI
HANDRAIL
DECK FROM 1/2" SHEET BALSA
STANCHIONS
CORK
CORK
CORK
L
R LINE
TOR
VANE
BULKHEAD 1
BULKHEAD 2
1/2" SQ. BALSA
1"X 1/4" OBEC
BILGE KEEL
LE
BALLAST KEEL

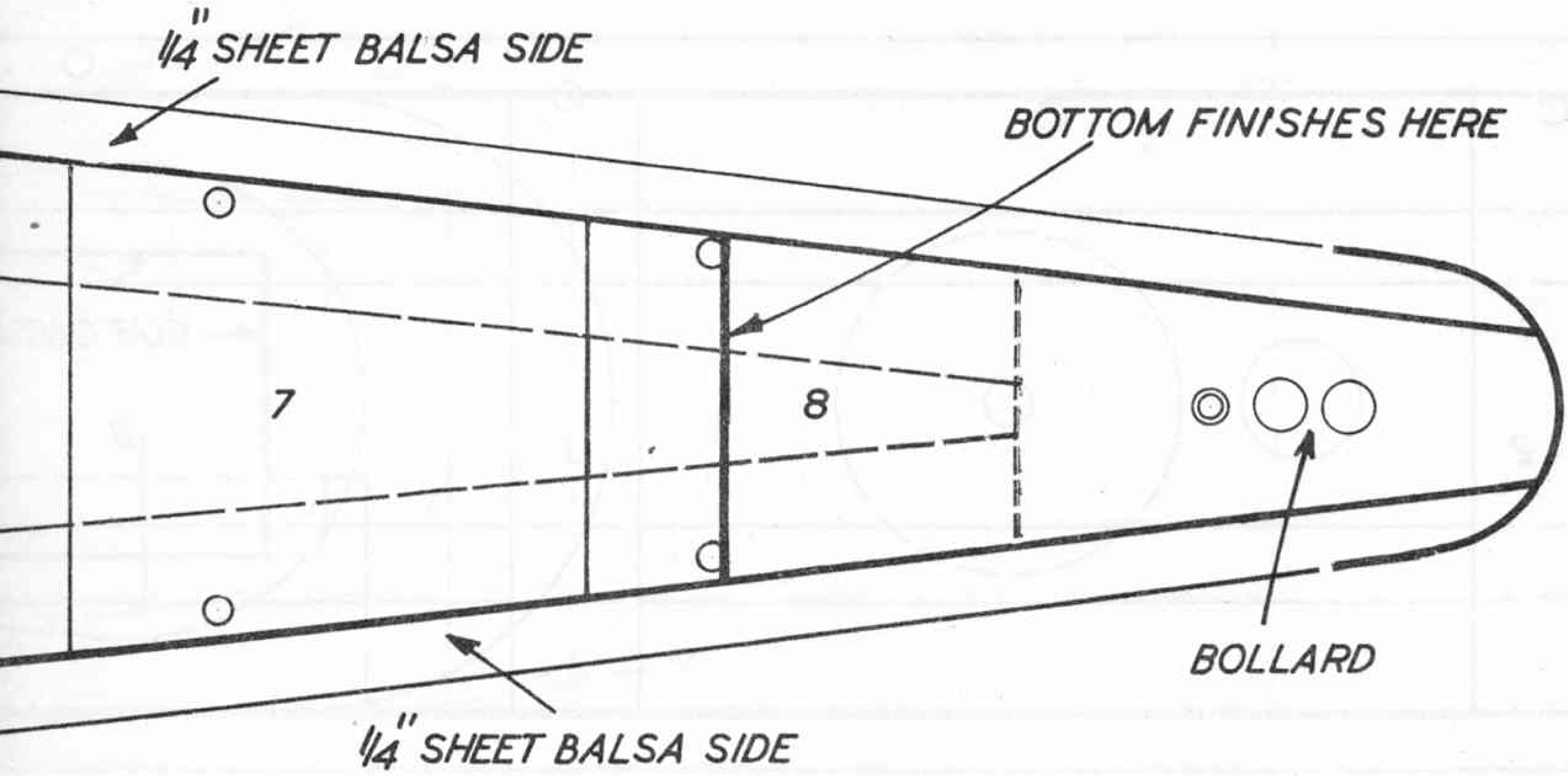

CUT OUT IN DECK
B
2
3
SEE TEXT FOR CONNING TOWER DETAIL
GUN
GUN MOUNT
WINGNUT
GASKET
CORK
DOWEL
SWITCH
BULKHEAD 2
BULKHEAD 3
4 B.A. STUDDING
BULKHEAD 4
BATTERIES
1"X 1/4" OBECHE HOG
T KEEL
B
BOTTOM CUT FROM

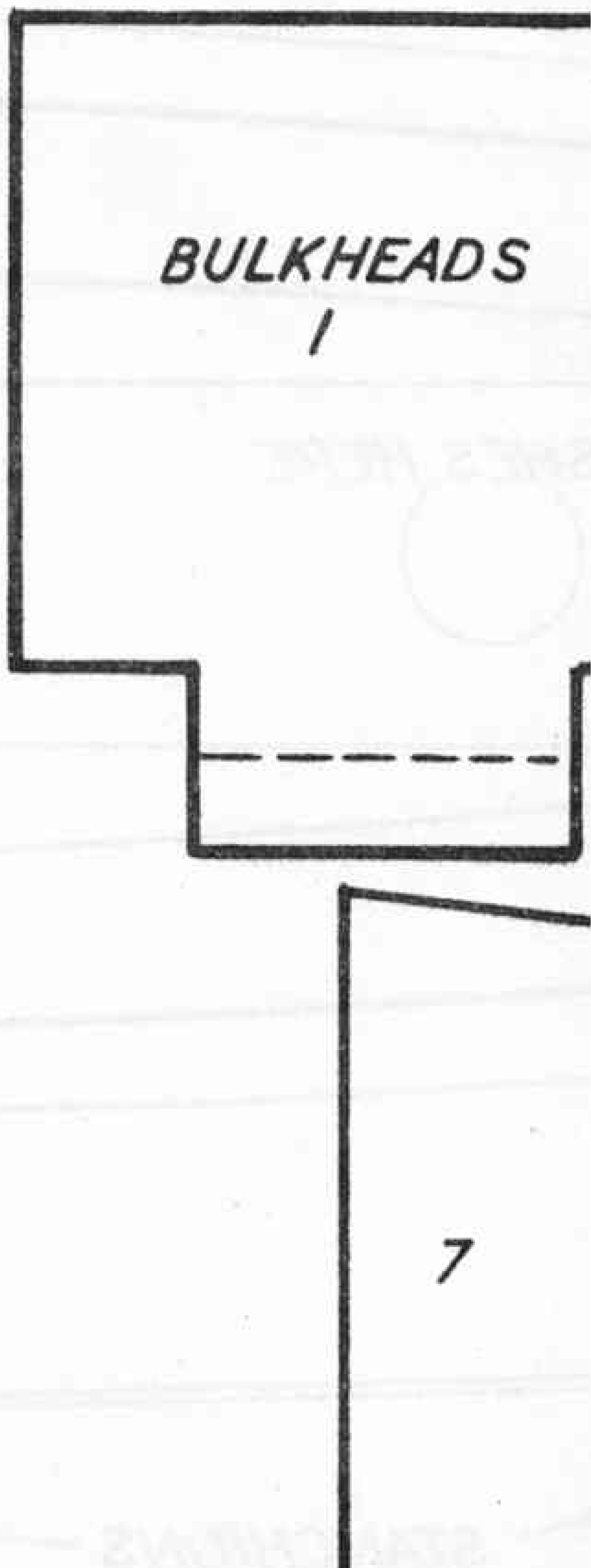


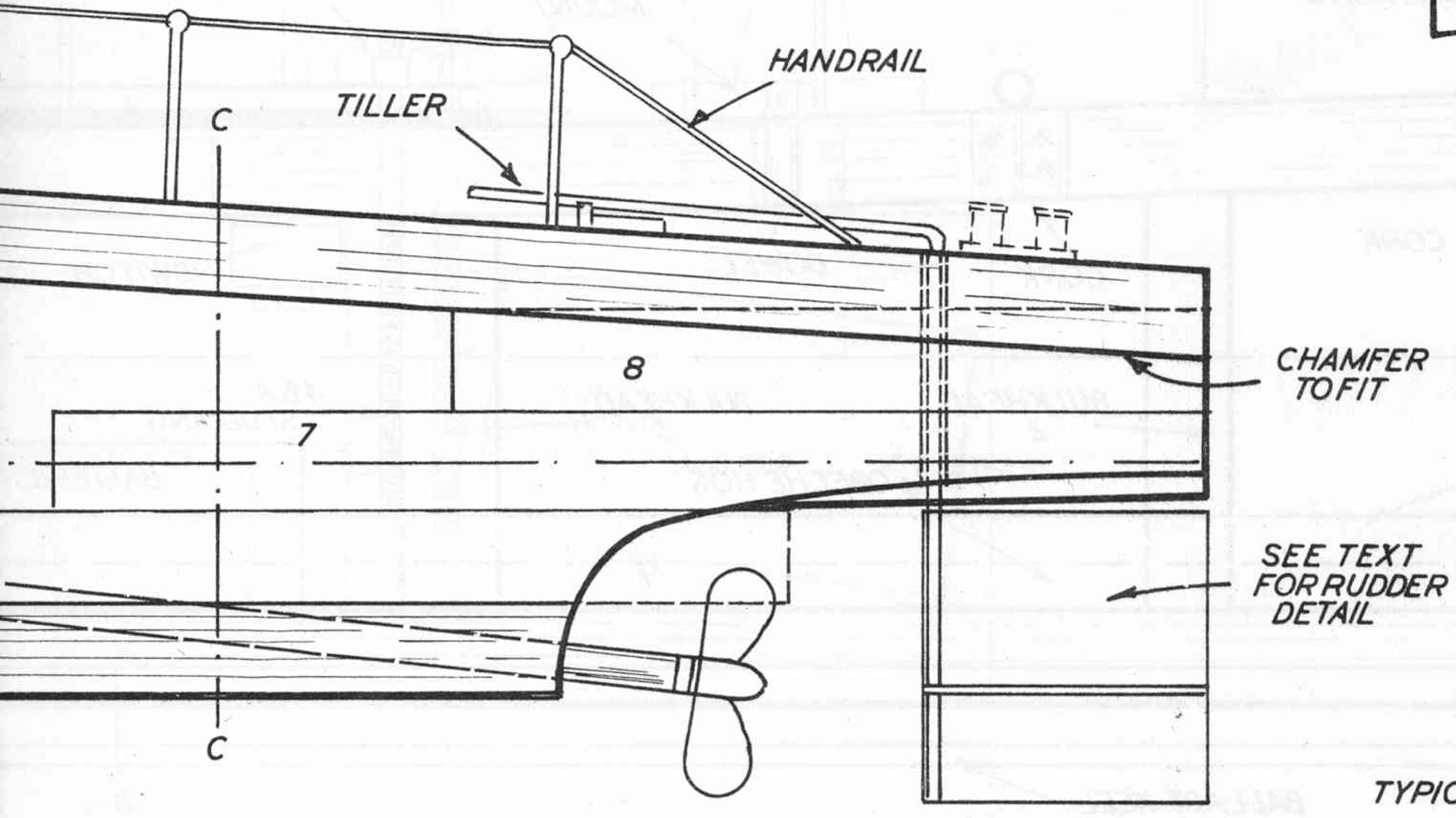
DECK
4
10
WINGNUT
9
GASKET
X
CORK
4 B.A. STUDDING
BULKHEAD 4
MOTOR
BOTTOM CUT FROM 1/2" SHEET BALSA
X


1/4" SHEET BALS
OUTLINE OF DECK AND BOTTOM
HOG FINISHES HERE
6
7
STANCHIONS
BOLLARD
1/4" SH

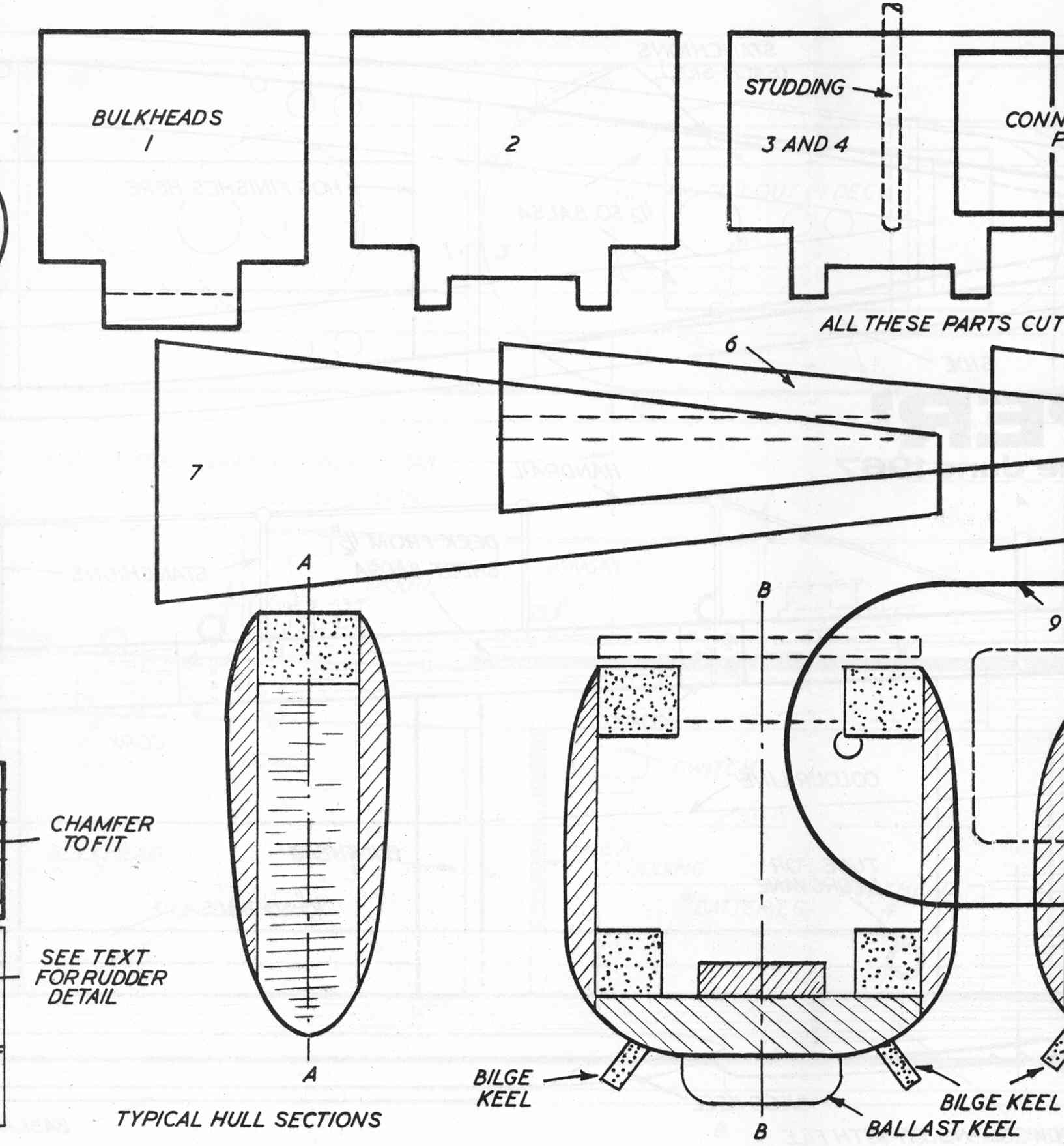

BOLLARD
T
C
X
CORK
BULKHEAD 5
9" STERNTUBE
7
6
C
X


1/4" SHEET BALSA SIDE
BOTTOM FINISHES HERE
7
8
BOLLARD
1/4" SHEET BALSA SIDE


BULKHEADS
1
7


HANDRAIL
TILLER
C
8
7
C
CHAMFER TO FIT
SEE TEXT FOR RUDDER DETAIL

TYPICAL HUL



TYPICAL HULL SECTIONS

NG
D 4
CONNING TOWER PLUG
5
ALL THESE PARTS CUT FROM 1/2" SHEET BALSA
8
1/8" PLY
10
9
GASKET
C
C
BILGE KEEL
BALLAST KEEL